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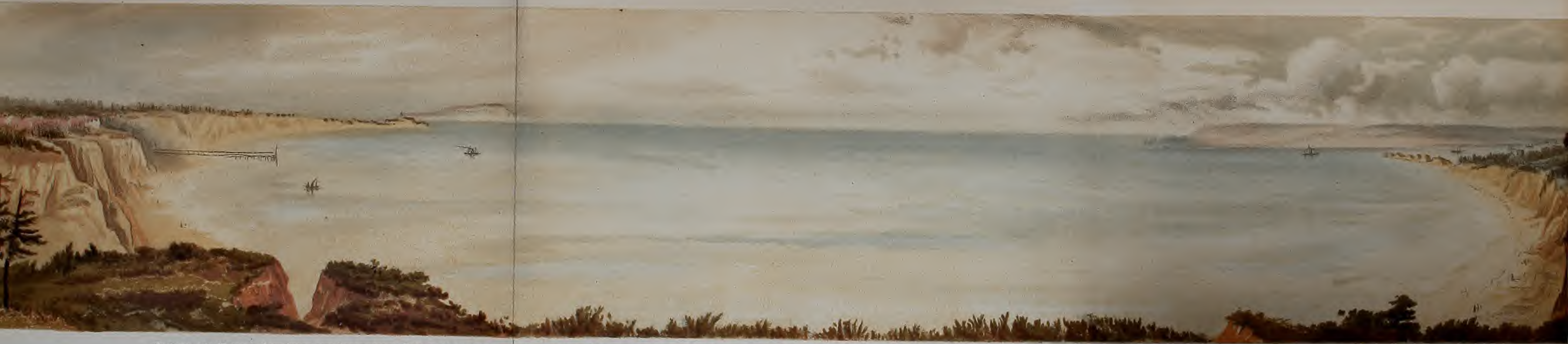

Eastern and Western Rain-Traps and Bournemouth Bay, from the Cliffs at Westbourne.—On the left, Isle of Wight, Hengistbury Head, East Cliffs and Chines, Pier, West Cliffs and Chines. On the right, Branksome Cliffs and Chines, Sand Banks, Entrance to Poole Harbour, Studland Bay, Purbeck Hills and Old Harry Rocks.

(For further details see Plate VII.)

THE MEDICAL ASPECTS
OF
BOURNEMOUTH
AND ITS SURROUNDINGS.

ILLUSTRATED WITH CHROMOLITHOGRAPHS (BY HANHART),
FROM ORIGINAL SKETCHES BY THE AUTHOR.

BY

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DISEASES OF THE CHEST, LONDON.

SECOND EDITION, WITH FOUR ADDITIONAL CHROMOLITHOGRAPHS

LONDON:
SMITH, ELDER AND CO., WATERLOO PLACE.
1886.
c

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PREFACE TO THE FIRST EDITION.

(1885.)

Many of the most important and interesting cases that come before me are seen only once, or perhaps twice, in consultation with the family doctors in attendance, so that I cannot keep notes of their progress or results. Therefore, I have often been unable to make use of the cases that would have most strikingly illustrated the medical points of my book.

The cases I have quoted being necessarily those of private patients, who might not care to have them recognised by their friends, I have omitted both names and initials; and dates, places, etc., have been so transposed as to evade identification. Consequently, if any one thinks he recognizes his own or his friend's case he may be sure he is mistaken.

I have arranged the succession of my chapters in what seemed to me to be the most readable literary order. But each chapter is fairly complete in itself, and a copious note of its contents is given at its head, so that any reader can easily select the subjects which appear most interesting.

In Chapter V., pp. 135, 136, I have specially referred to those patients who, I think, ought not to be sent to Bournemouth; and in Chapter IV., p. 123, to those who, I think, ought, and to those who, I think, ought not, to be sent to Alpine stations in winter.

My apology for introducing copies of my own sketches, instead of photographs from nature is, simply, that I was unable, in any other way, to get the exact views required for the purposes of my book.

Those who would like to possess photographs of the many and varied beauties of the scenery in Bournemouth and its surroundings, will find in the contents a list of those which are, in my opinion, the most charming and illustrative. They can all be obtained at the Libraries, Bournemouth, by quoting the titles I have given.

Streate-Place,
March, 1885.

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BOURNEMOUTH.

CHAPTER I.

PRELIMINARY OBSERVATIONS.

The Author's Experience of Bournemouth and other Health Resorts—Object in Writing—Plan of the Work—Unreasonable Expectations of some Patients—Typical Climates and Heroic Remedies—Need for Caution and Consideration—Some Difficulties and Dangers—Luxor—New Zealand—The Continent.

The good fame of Bournemouth has already been made and widely spread, not only in this country but abroad.

There is no need, therefore, for any one to "write it up," and no one who has seen its beauties and had experience of its climate could have the heart to "write it down."

Happily I am not called upon to undertake either of these distasteful tasks. I did not come here, as many have done, for the purpose of making a fortune, or even to earn a living; not quite, I must confess, to realise the poet's dream, and "seek the rest found sweetest in a peasant's home," but, as Max Adeler would say, "to get out of the hurly burly," and seek some "calm and learned leisure" after an arduous career.

My only wish, therefore, is to perform the simple and pleasant task of laying before my professional brethren, without prejudice on one side or the other, an independent and carefully considered account of the medical aspects of Bournemouth and its surroundings.

I do this in answer to the numerous inquiries of medical friends and others, who, since I left London, have written to me from all parts of this and other countries, anxiously asking "what I think of Bournemouth as a health resort?"

My opportunities of forming a dispassionate and sound opinion of the place are so unique, that, notwithstanding my disinclination to write any more books, I feel that I ought not to hesitate to try and give a more careful answer to these inquiries than can be done in private letters.

I commenced private practice in London in May, 1849, at the age of twenty-one, and I came to reside at Bournemouth in October, 1882. The period of thirty-five years comprised between 1849 and 1884, the year in which I now write, fairly represents the entire life of Bournemouth as a health resort; and I have known it more and more intimately during the whole of that time. Although I never restricted my practice to any one specialty, the interest I have always taken in affections of the heart and respiratory organs, and my connection with the Royal Hospital for Diseases of the Chest, first as Physician and subsequently as Consulting Physician, from 1859 to the present hour, have necessarily brought before me a yearly increasing number of patients who have been to Bournemouth for their health—many that I and my colleagues sent from the Royal Hospital, many that I sent in private practice, and many, who came before me in the course of London consulting practice, who had been sent by other physicians than myself, or who had gone of their own will, without medical advice. To these may be added many friends, not invalids, who had gone to Bournemouth with their families for a summer or autumn holiday.

It follows from this combination of circumstances, that I have had opportunities of seeing the effects of the place upon all sorts of cases, some in which the climate was suitable, and some in which it was unsuitable.

Many of these patients, of course, visited other health resorts in different parts of the world, either before or after their residence at Bournemouth, and were able to communicate their experiences and opinions to me; and I have always found it medically instructive and interesting to listen to such records.

My "Reports on the Progress of Medicine in Different Parts of the World," and my "Reports on Diseases of the Chest in Different Parts of the World," kept me in constant communication with my medical coadjutors in all the health resorts of this and other countries, and obliged me to collect and compare their observations.

In 1880, wishing to get occasional relaxation from London work, and looking about for a place that might combine the greatest number of advantages for a country home, I selected Bournemouth.

In the same year, when I originated the design of bringing to this country the system of treatment known in the Auvergne as the "Mont Dore Cure," I advised the medical practitioners of Bournemouth to secure its establishment there as the place offering the most perfect climatic advantages.

In 1882, in the midst of the flood-tide of professional work a great domestic bereavement rendered the associations of London society so unbearable to my wife and myself, that we fled to our Bournemouth home to spend the rest of our lives amidst new thoughts, new scenes, and new spheres of work.

The calm and beauty of the neighbourhood was so delightful, that when summer came we felt no inducement to go to any other place for a holiday; and thus from the day we came down (September 28th, 1882), till the present time (November, 1884), except when occasionally summoned to a distant consultation, I have not been out of Bournemouth or its surroundings for twenty-four hours.

This has given me the opportunity, which I wanted, of studying the effects of the climate upon the residents as well as upon the visitors, at all seasons of the year; my previous experience having been more particularly concerned with its qualities as a winter health resort.

As I before said, therefore, my opportunities of forming a dispassionate opinion of Bournemouth and its surroundings, must be admitted to have been unique.

My only difficulty is to know how I can best put this into writing for the benefit of others.

The fashionable way of writing a book about a health resort, has long been to enter it in a competition with a number of other health resorts, in an elaborate and perplexing comparison of skilfully manipulated tables of temperature, rainfall, barometric and hygrometric readings, sunshine, wind, mortality, etc.; in which, by some miraculous, mysterious, or "fortuitous conflux of atoms," the place in question always manages to turn up trumps upon the vital points.*

Sympathising alike with the famous words of Lord Beaconsfield, "Confound your figures," and with the old axiom that "Comparisons are odious," I have decided to avoid both the comparisons and the figures so far as I possibly can, and to adopt a method of placing my opinions before my readers which I hope may prove as much more congenial to their tastes, as it certainly is to mine.

Again, it has been usual in medical books about health resorts to make them also local "guide books."

I intend in this work to avoid, as far as I can, all but the medical aspects of my subject. Fortunately all the necessities of a guide-book have been well supplied already in "Hankinson's Descriptive Guide to Bournemouth, Christchurch, Wimborne, etc.," of which new editions are frequently issued; and no description of scenery that I could pretend to give in writing would present so graphic an idea of the places of interest as the series of lovely photographs published at the Victoria Library, of which I have given a selected list (see Contents), from which any one or more of them can be ordered.

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* "The annual isotherms, however, do not convey any correct impression of the real conditions of climate of the globe, for, as already stated, the bare statement of an average value gives no idea of the extent of variation among the actual figures from which that average has been derived. To take an example: Dublin and Astrachan differ only 1°·1 in their mean annual temperature, that of the former being 50°·2, and that of the latter 49°·1; but while the temperature of January at Dublin is 41°·2, at Astrachan it is 20°·5, being a difference of 20°·7. In July the contrast is nearly as great, for Dublin has a temperature of 60°·4, being 15°·7 colder than Astrachan (76°·1). It is needless to multiply instances; they will be evident from inspection of the maps for January and July, and of the Range Map, Plate XI."—p. 226. "Elementary Meteorology." By Robert H. Scott, M.A., F.R.S., Secretary to the Meteorological Council, and author of "Weather Charts and Storm Warnings," 2nd ed., 1883.

Such illustrations as I have introduced into my book are copied from sketches which I have made on the spot, to give an idea of the meteorological, geological, and hygienic aspects of the neighbourhood. (See Preface.)

The way is thus cleared for me to proceed at once to treat of the purely medical aspects of my subject.

In the first place, I must remark that neither Bournemouth nor any other part of the United Kingdom has a climate exactly like that of Africa, Australia, Egypt, the Andes, Minnesota, Iceland, Davos, the Rocky Mountains, or the Nubian desert, either in summer or winter!

From the expectations with which I have found the minds of some patients filled when sent to Bournemouth, the above apparently trite remark is not so altogether unnecessary as it might at first appear.

The places I have just enumerated, possess typical climates which form good landmarks in considering the effects of other places upon health and life, and which, like other heroic remedies, are apt to be not less potent for evil than for good; and they have this inevitable objection that a patient once sent to them can hardly escape, until it is too late to find a more appropriate place, although it may prove that the suitableness of the remedy for the case has been misjudged, or that the case has changed since the remedy was prescribed.

As I said when writing on a similar subject in 1880:—*

"If we could send our patients here or there exactly at the right moment, and each time to the place accurately adapted to the passing phase of the case, we ought unquestionably to select those strongly marked distinctive climates which I have described; but, practically, how seldom we can do this! And let us remember what happens every day in practice, to the infinite risk of the life of the patient, and of the reputation of the physician. Patients consult their physicians and receive, we will assume, advice as to the choice of climate cautiously and wisely adapted to their condition at the time; and after such advice is given, circumstances occur which alter their plans and delay their seeking the prescribed change until their state has so far altered *that if they consulted their physician again he would certainly reverse his former judgment.* But instead of giving either themselves or him this chance, they carry out, at great expense and inconvenience, a plan of climatic treatment utterly unfit for the changed conditions of the case.

---

* "On Loss of Weight, Blood-spitting, and Lung Disease, etc." 2nd ed., 1880.

"On the whole, therefore, under ordinary circumstances, more good and less harm may often be obtained by climates which to some extent *combine* the qualities I have described—even though they have not either of them developed in perfection—provided they are near home, within reach of friends, and under the management of a judicious physician, who can watch the changing aspects of the case, and point out the time and mode in which to take advantage of this or that feature in the climate of the place, or when to change it for another." (p. 260).

The day has passed in which it was believed that there must be a specific climatic cure for every disease—that, having discovered the nature of the patient's complaint, he might be sent to this or that place for its cure, with as much precision as quinine might be prescribed for an ague, and that to send him to any other place was like administering poison in place of the proper drug.

I ought to say *happily* that day has passed, for no professional or popular delusion has led to the sacrifice of more lives, to more domestic disruptions, blasted hopes, or weary disappointed longings for that which, *while impossible*, was still believed to exist.

The conviction of to-day, that even the most typical climate is only a more or less powerful adjuvant to other medical treatment—a favourable condition of existence—brings us within the regions of reason and common sense. (See Chap. V.)

The general experience of all things in this life—that there is "no rose without a thorn"—no good thing without some danger of an accompanying evil—is never more true than in the matter of climate; and it is often very difficult to decide on which side the balance turns—whether for good or for evil.—(See Chap. IX.) It is quite certain that if we wish to make the wisest choice of climate for a patient, it can only be done by a most careful consideration of all the bearings of his case, medical and social, and by an intimate acquaintance with the black side as well as the bright side of the *places* as well as of the *climates* between which we have to choose. I say advisedly of "the places," for the most typically suitable climates may be ruined by the places at which they have to be sought, or by the dangers and difficulties of getting to or from them.

Thus, in 1873, Dr. Dunbar Walker,* writing of Nubia, said:—"If there is any air or climate in the world that offers most advantages for the cure and non-development of phthisis, Nubia possesses it. . . . If some enterprising person would build a comfortable hotel, and provide it with requisites for invalids at Luxor, it would form a glorious sanatorium for affections of the chest." (p. 91.)

Well! in 1879, an hotel having been established at Luxor under the most promising auspices, a patient who had been tempted to winter there wrote to me as follows:—

"*Notes of Objections to Luxor Hotel.*

"*Damp Rooms.*—I was put into a damp room (after being assured that it was perfectly dry) on the 27th December, and could not change until the 20th February, although I discovered the damp on the 18th January. This gave me bronchitis, pleurisy, and rheumatism.

---

* "Egypt as a Health Resort," etc. By A. Dunbar Walker, M.D.

"The rooms were stone-floored, and the dampness was caused by the stones being laid in about three inches of wet mortar a few days before we went into the rooms. The number of old (and consequently dry) rooms was, I think, eleven; of these six had no windows, but only badly fitting French doors and jalousies.

"I may mention that I am not the only one that was in the same plight. Madame P. will remember the commotion that was caused by the discovery.

"*The Hotel* is built on a most absurd plan for invalids, as all the bed-room doors open to the air; and after dinner we had to leave a hot dining-room and go through the cold night air to our bed-rooms. There are no means of communicating with servants or the doctor during the night in case of illness. I had a very bad attack of pleurisy during the whole of one night, and could of course get no relief until some one happened to come into my room the next morning.

"Whatever alterations are made in the hotel, I do not consider that it will ever be fit for invalids. A correct plan of it will show this directly.

"*The Food* was simply abominable, and the cooking worse, and sometimes there was not enough of some of the dishes to go round.

"The Dahabeahs all had good meat, so that it was not because food was scarce that we had it inferior, but evidently on the score of economy.

"There was no attempt made to make invalids comfortable, and if ill I don't know who would have attended to one.

"The dogs howled under our windows all night, and no attempt was made to keep them away. Three donkeys were kept on the premises, and brayed all night. In fact I found sleep almost impossible.

"These annoyances might have been put up with in an ordinary hotel full of strong, healthy people, but in a place professedly for invalids (in fact, a 'sanatorium') they were unbearable.

"I don't know whether you have seen Mr. C. or Mr. H. yet. They will give you their opinion, and you will see whether I have exaggerated.

"I have not got rid of my cold yet, the weather is so trying."

I am glad to say that since the date of that letter things have mended, and many invalids have given a very different account of Luxor Hotel, partly in consequence of improvements due to the very strong representations which my patient and his friends made to the authorities.

But another difficulty now has arisen to spoil the Nile trip and residence in Nubia for this and perhaps other winters; for while I write (September, 1884), the Nile is blocked, and Nubia barred by all the panoply of war.

The voyage to Australia and New Zealand has many great advantages, but the risks are also seriously to be considered. Thus, the son of a colonial banker, who came over from New Zealand to consult me last year, and who therefore had a full acquaintance with the voyage, as well as the means to acquire every comfort and protection practicable, wrote me, January, 1884, after his return to New Zealand, as follows:—

" . . . . The passage was a decided failure, the ship was cold and uncomfortable, and we met the most dreadful cold and damp weather all the way between the Cape and New Zealand; and although our captain was a decent man and a good sailor, he was too weak-minded with his passengers; so a bright lot of British youths, we were taking out, kept up one continuous orgie in the saloon night and day. Our ship doctor was very nice, and apparently a very clever man, which was a comfort. . . . . I complained of slight rheumatism to you before I left; that increased during the latter part of the voyage to very severe rheumatism and sciatica, and I was kept in agony day and night for weeks. Salicylate of soda and other remedies proved equally useless, so I had no course but to 'grin and bear it.' But my cough increased, and I rapidly lost flesh. . . . . The weather here is vile—no summer at all.

" The doctor says my right lung is still quite untouched, but does its work weakly. The left lung works slightly in parts, but has mostly solidified. However, he says there is very little mischief going on now, and that it seems almost dry. The *seton* has quite healed, and I feel surer of nothing than of the benefit I derived from that same seton."

A residence in the South of France is often regarded as an easy change for an invalid who cannot bear a longer journey. Yet even this amount of travel may be attended with serious inconveniences which no precautions can prevent. Thus, in 1881, after much consideration, I sent an exceedingly delicate girl and her family to the Riviera, in charge of a first-rate medical man, and with every protection and comfort that wealth and forethought could suggest; but the doctor wrote me—

Lyons, *October*, 1881.

"Up to the present time I could have sent you excellent reports of Miss ——, *but I don't know what will be the consequence of an accident which happened to us to-day.* We had engaged a saloon carriage with every comfort. . . . . The train left Paris at 8.20 p.m., and had gone through the night very comfortably . . . when, after leaving Macon and being within ten miles of Lyons, the train suddenly left the line, and we suffered a fearful shock till the train was stopped. The engine and last three carriages alone kept the line, and fortunately, the line at this part being perfectly level and quite straight, we were thus saved being utterly smashed. After *waiting three hours* a train came up from Lyons, and transferring to this we were taken on to Lyons, but of course too much shaken to proceed. . . . . Miss ——, herself, bore it bravely, but feels very tired and aching; whilst Mrs. —— and Miss —— caught bad colds, as it had been *raining all night* and was very damp and chilly. We kept Miss —— snug and warm, kept her well fed, and did our best to lessen the shock, but it cannot but have a deleterious effect, especially as we have another 250 miles or so yet to get over. If the patients have sufficiently recovered we shall try and leave this for Marseilles on Monday, but earlier than that will be impossible."

So much for all our care and precautions!

Many other accidents are constantly occurring to interfere with the advisability of foreign travel.

Thus a letter just received from a gentleman who was piloting home an invalid from Switzerland, says: "This route was almost a necessary choice, because B— is nearly in a state of *émeute.* There was bloodshed there on the station on Saturday at the very time we should have arrived."

And I regret to add, that while I write, September, 1884, cholera is raging in Italy, and has not yet left Marseilles, Toulon, Spezia, etc.

December, 1877.—A London physician wishing to go South for his own health and to do some "season practice"—decided upon Spezia—and I cautioned him against the malarious and polluted quality of the air of some parts. He wrote me December, 1877: "I stayed here a few days to get acquainted with the place before deciding to settle for the winter. I came to it full of forebodings from the dismal picture you drew of it. My first endeavour was to find the malarious district! . . . . Spezia and its environs are absolutely free from marshes . . . . in fact, we saw, etc., etc., etc.—Enough!—malaria in Spezia is a bugbear, the Vice-Consul told me that he and his family had lived here some years and had always been well, and that in fact it was so healthy a place that a doctor was not wanted."

Compare this with the following from the *Times*, September 11th, 1884:—

"Severe as was the visitation of cholera at Toulon and Marseilles, it cannot compare with the intensity of the outbreak at Naples and Spezia. . . . We gave yesterday an account by a correspondent at Spezia of the outbreak in that town. . . . . Many of the cases there appear to be of the malignant and intractable type which all zymotic diseases occasionally assume, the ordinary course of the malady being cut short and the patient succumbing in an hour or two or even in a few minutes after the development of the attack. . . .

"The graphic account of the sanitary condition of Spezia given by our correspondent renders it easy to conceive that the physical constitution of the people is as unfitted to withstand the attack of disease, as their mental fibre is to resist the demoralisation of fear. . . . Owing to the outrageous neglect of the most ordinary sanitary precautions, the population (of Italy) is in that condition of unstable vital equilibrium which renders it an easy prey.

"The streets in fact are the sewers, and the cesspools are merely traps for the solid matter which the Italians erroneously fancy to be the more valuable for agricultural purposes. . . . A heavy rainfall entering these places from the house drains would naturally produce a great overflow into the streets, which, mingling with the surface water, seems by another ingenious adaptation to find its way into the wells, and to flood the basements of low lying houses."

These are only suggestions of the many contingencies that must always be reckoned with, when we send a patient, who is seriously ill, away from home. Those who are interested to continue the subject further may pass on to Chapter IX., "On the Drawbacks to Foreign Travel," where it is fully considered.

CHAPTER II.

CLIMATE OF BOURNEMOUTH.

Explanation of the Special Climate of Bournemouth—Undercliff, Overcliff, and Heathland Sites considered—Rain-traps—The Soil a vast Pile of Sand and Gravel—The Chines, as Watersheds and Ventilating Channels—Division by the Valley into East and West Cliffs—S., S.W. and W. Aspect of Houses—Pleasure-grounds—Description of the Place—Impossibility of Ground Mists—Altitudes of Chief Parts—Geology—Wetness of Soil a Cause of Phthisis; Dryness a Preventive—Latent Humidity, Dampness and Sensitive Dryness discussed—Relief of the Land, its Influence—Tyndall's Vapour Screens—Barrier of Cliffs below the Houses, important—Summary of Climatic Character.

THE special climate of Bournemouth is explained without any need for complicated meteorological speculations. The configuration of the coast, the characteristics of the soil, the position of the town, and the pine woods, speak for themselves.

We see a fine bay with a very slightly receding tide,* surrounded on three sides by a deep crescent of sand cliffs over 100 feet in height, terminating, on the eastern side, in the promontory of Hengistbury head, and still further out to sea, beyond the channel of the Solent, by the Isle of Wight; and, on the western side, terminating in the "Sand banks," and then further out to sea, beyond the Channel leading to Poole Harbour by the long-range of Purbeck Hills, ending in "Old Harry Rocks." The fourth side is open to the full expanse of the Channel. (See Plate I.)

The tops of these eastern and western cliffs do not run up in terraces, blocking in the air and draining one upon another; but they consist of fine open undulating heathland, extending far back into the surrounding country in all directions, and clothed with pines and other evergreen trees.

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* See Chapter VII. for Tide-tables.

On these heaths and amidst these pines and evergreen trees the houses are built.

No doubt the place would be a little warmer if it formed an amphitheatre round the bay, or if it had been built under the cliffs instead of upon them; but any warmth thus gained would have been at the expense of refreshing and bracing qualities far more important to health than a degree or two of elevation of temperature obtained by sacrificing them.

"Neither theory nor the teachings of experience justify the belief that more or less frequent movements of the atmospheric ocean have a harmful effect upon consumptives. On the contrary, these movements are necessary for changing the air surrounding us, which in stagnation becomes charged with deleterious matter. Rain absorbs and precipitates these admixtures, while atmospheric motion scatters them."*

Although there is undoubtedly a limited number of patients, for whom an undercliff air fully charged with marine moisture has special advantages; for the large majority of patients the air of the plateau above the cliffs, less moist and less strongly saline as it is, is far preferable.

I consider the heathland character of the site of Bournemouth of the utmost importance in its medical aspects, and much gratitude is due to the early planners of the town for not building the houses under the cliffs instead of upon them.

Plate IV., taken from a sketch of the Holdenhurst Road, just beyond the present region of houses, although fast being encroached upon by them, is intended to show something of this heathland country, at the same time that it gives a distant view of the extremity of St. Catherine's Hill and Lord Malmesbury's pine and rhododendron woods about Herne, forming the eastern boundary of the landscape, while on the left it shows the beginning of the long line of pine woods running across the northern boundary, and on the right the beginning of a similar plantation crossing the heathland on the east. These two lines of elevated pine woods and the hills of Herne form eastern and northern inland *Rain-traps,* collecting many a rain-laden cloud, and stopping many an eastern and northern blast on their way to Bournemouth. The most important *Rain-traps,* however, are those out at sea, Hengistbury Head and the Isle of Wight on the eastern side of the bay, and the Purbeck hills, terminating in Old Harry Rocks on the western side, represented in Plate I.

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* "New Mexico: its Climatic Advantages for Consumptives." By J. Hilgard Tyndale, M.D. 1883.

The next most striking feature is the soil—a vast pile of the finest sand and gravel, as seen in Plates II. and III., showing natural sections of the east and west cliffs, where they have been broken through by old watercourses and landslips, forming Boscombe and Alum Chines.

These chines, of which there are many smaller ones besides the three principal ones—Branksome, Alum, and Boscombe—have a very potent influence for good, in addition to the beauty which they give to the scenery. (See Diagram of the Cliff-line, Plate VII., Chap. VIII.)

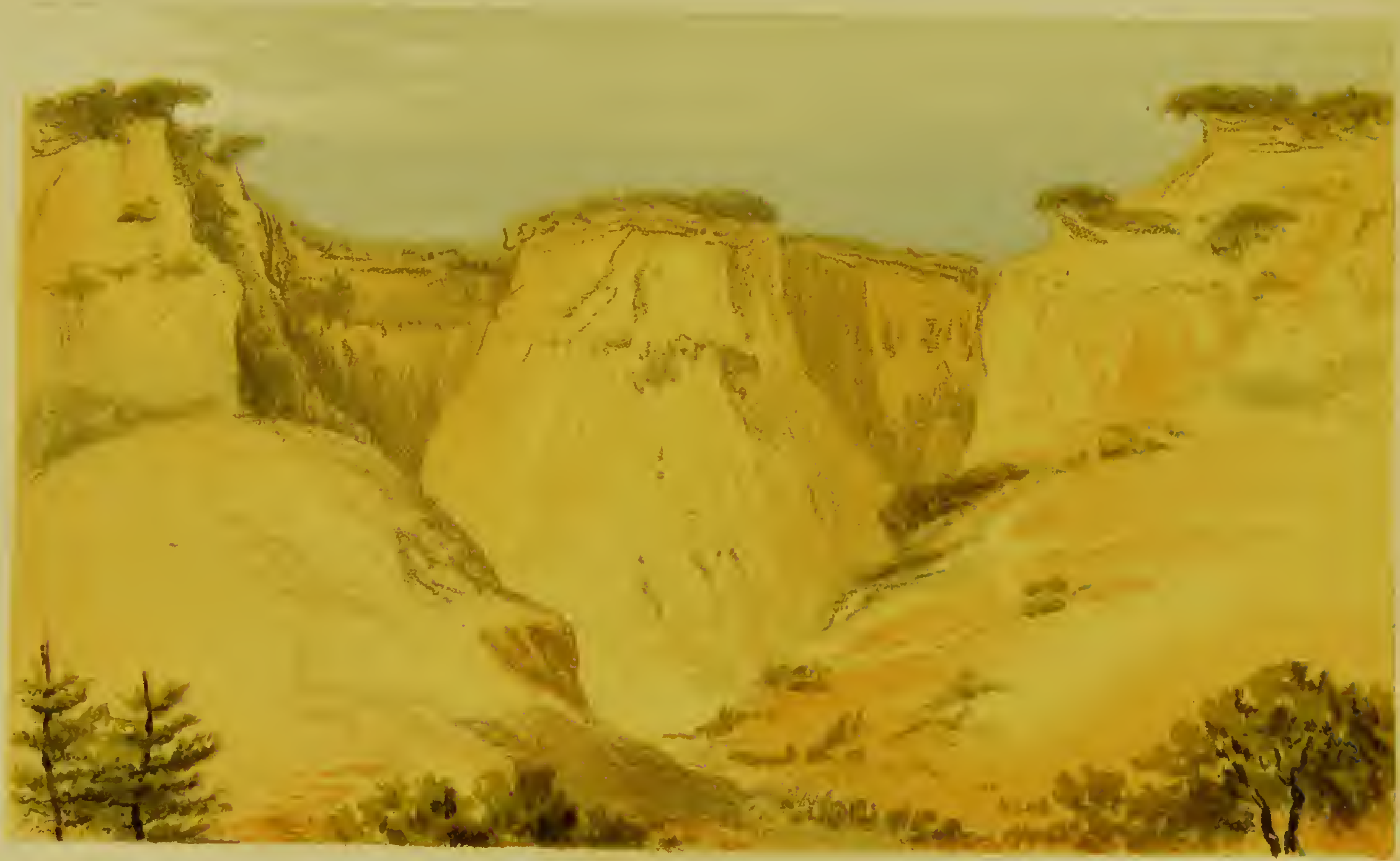
1st. They constitute watersheds from the adjoining cliffs, draining off into the sea the surface water that rushes over their tops, or percolates through their light sandy soil; and 2nd, they form channels by which the sea breezes are allowed to penetrate among the houses inland.

But in addition to these so-called chines, there is the much larger, deeper, and longer chine called the Valley of the Bourne, upon which depends the distinctive division of Bournemouth into East and West Cliff, the eastern or left-hand side of the valley (when looking to sea) facing west, and the western or right-hand side facing east. Houses built parallel with the cliff-line face the bay, that is the south, while houses built on the eastern banks of this long valley or chine have a western and south-western aspect. Those built on the western banks would look east, or south-east and north-east if they had their fronts in the valley line; but, as a matter of fact, the builders have skilfully managed so to turn and dot them about that nearly all the houses on both sides of the valley have their principal faces to the south, south-west, or west. This has been made possible by the undulating character of the ground, the number of knolls, and the serpentine direction of the valley itself. This long, broad, serpentine chasm, gradually increasing in depth and expanse as it comes down from the moorlands to the sea, with its pebbly stream at the bottom, is now carefully drained and converted into the extensive pleasure grounds, with their wide lawns, shrubberies, fir plantations, beds of flowers, and broad walks, which strike all visitors to Bournemouth with their novel beauty, and give such a peculiar air of gaiety, pleasaunce, and freshness to the place.

This largest of all the chines, with its expansive opening at sea level opposite the pier, has a proportionately large effect of the same description as the smaller chines—as a water-shed for the adjacent cliffs and hills, and as a channel for fresh air.

The writer of the following somewhat ecstatic passage might well have meant to describe Bournemouth, and to show how, in spite of a wonderfully sandy soil, beautiful woods and gardens may flourish: "All at once you find yourself in an enchanted ground, a region of still beauty and peace. It is not gorgeous. . . . It is the land of peace, not of glory. The dark, shady forest, yet all lighted up and brightened with the sun . . . . the masses of evergreen shrubs, the stillness and the quietness of the scene form a whole which makes us feel as if the angel of repose and peace were hovering over us.

"And yet the height itself is no more than a sand-hill, or rather a series of sand-hills; but upon these sand-hills is set a labyrinth of beautiful villas, of every size and every shape, all surrounded by their little gardens, and all and everywhere surrounded by pines. For it is in very deed a city built upon sand. Up banks of sand, down hills of sand, through cuttings



NATURAL SECTION OF THE WEST CLIFFS AT ALUM CHINE.

PLATE II. (*To face Chapter II.*)

of sand you go, and perched on the top of sand-banks, nestled at the bottom of sand-banks, looking into gorges of sandy forest, those lovely villas stand. Some there are in unconnected rows; others all alone, but in friendly proximity, facing every point of the compass. Up high, overlooking the sea; down deep, buried among the pines; everywhere villas. There is no order, no stiff formality; in shape, size, and architecture, each differs from its neighbour; but the effect of the whole is a scene which the eye delights to look on."*

This sketch of Arcachon would not at all apply to Bournemouth, however, when it speaks of the houses facing all points of the compass—for the architects at Bournemouth seem to have worked with a compass in their hands, arranging by all sorts of manœuvres to turn the best face of every house either to the south or south-west. If each house had itself been a magnetic needle with its back for the north pole, it could hardly have more pertinaciously turned its face to the south.

Mr. Spindler,† after asking, "Now, what was it that forced me to love the place (Bournemouth) at first sight?" says "Its natural attractions have been developed by man to the utmost. And by what means? Well, by the simplest and in the result the most wonderful:—By planting trees, trees, trees, everywhere and everywhere!

"Truly Bournemouth has quite a character of its own. Terraces, squares, and even rows of houses (excepting the streets of shops) are, at least up to the present time, very rare, the houses being principally detached or semi-detached, and mostly standing in their own grounds, which are laid out as gardens and planted with flowers and shrubs, and in many cases sheltered and surrounded by pine trees . . . . Then there are the boast and pride of Bournemouth—the pleasure gardens—right in the centre of the town. They begin close to the beach and extend along the course of the Bourne. . . . They thus form an open space free from buildings, in the very heart of the town. . . . These pleasure-grounds, laid out with great taste and care, are always open to the public, and although they are far too young to have reached the zenith of their beauty, they are already extremely charming. . . . They are luxuriously planted with evergreens, shrubs and flowers, and ornamental valuable native and foreign trees, and are bordered on either side with Scotch firs, by which some of the walks are shaded and sheltered from the wind. . . . The narrow river Bourne . . . . has been turned to useful account . . . . as it runs through the valley, and winds through the gardens, its green sloping banks, its pretty little waterfalls, and the picturesque rustic bridges, which span its course at intervals, have a most pleasing, complete and perfect appearance . . . .

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* "Sketch of Arcachon, by a Lady." 1882.

† "A Few Remarks about Ventnor and the Isle of Wight, Bournemouth, Torquay, Brighton, Weymouth, Jersey, and Guernsey." By Wm. Spindler. 1877.

"On each side of the gardens, and on the slope of the hills, both to the right and left, are numerous detached villas scattered about in an irregular and very picturesque manner, and for the most part hidden by pine trees. These pine trees, which are principally Scotch firs, are another distinguishing feature, and in possessing them, Bournemouth has a further great advantage over all other English watering-places. Retaining their dark green foliage throughout the winter, and intermingling with masses of evergreen shrubbery. . . . In addition they throw off a resinous perfume, and balmy, incense-like odour which pervades the air. . . . This is considered to be so beneficial to consumptive patients, and persons suffering from bronchial affections, that many of the most eminent medical practitioners in London are said to send their patients hither, to obtain the advantage of this circumstance alone.

"The large number of these trees in and around the town, in some parts forming regular woods, affords the most complete shelter from the cold blasts of winter, and delightful shade and coolness in summer. . . . Generally the houses are very well built, and for the greater part appear to be extremely comfortable. Their designs are very various and pleasing in effect, combining prettily with each other and harmonising with the landscape. At almost every conceivable angle these villas are erected, partially hidden amongst the foliage of the trees, beneath which grow luxuriant crops of ferns. So also when a villa is to be built, the trees and evergreens, the growth of which is everywhere carefully fostered, are not indiscriminately slaughtered, but only sufficient space is cleared for the erection of the house, a picturesque appearance being thus given to the whole. As Bournemouth is the creation of the last quarter of a century, it was easy for the original design for the town to be made with due care and attention to future effect. This happily has been the case both with regard to the dwelling houses and the roads, which latter from the very first beginning have been wide enough for all purposes, with spacious foot-paths on each side. . . . The houses in the older and better parts of the place stand back at about equal distances of 100 feet or so from the road. Each house is provided with neatly kept carriage and back entrances, and is surrounded by an ample garden, the shrubberies and pines in which have been only so far trimmed and cut away as to form a few winding paths, and to afford a peep of the sea through their bowers. This great advantage is shared by the houses both in the very centre as well as in the outskirts of the town.

"The fir plantations, together with the system universally adopted of erecting detached or semi-detached villas, have created for Bournemouth its distinguishing attractiveness, which consists in the most happy mixture of architecture, timber, and foliage, as unusual in seaside towns as it is beautiful and agreeable. They have given Bournemouth this lovely character of quietness and seclusion, for which it is justly popular amongst the higher and wealthier classes, and they have made it in a very short time indeed the most fashionable winter place in England.

"Really, the men who made Bournemouth, whoever they may have been, were men of great taste. . . .

"Such is Bournemouth, at present the most lovely—I think —of all English watering places. . . .

"Many new houses are being built in far too uniform a manner and much too near each other, sometimes even with little or no separation. In the western part of the town regular streets and terraces of lodging-houses begin to rise, which seem far more appropriate for Brighton than for Bournemouth.

"If this suicidal course is persisted in, and the inhabitants aim at building palaces and streets, and cut down their invaluable pine trees without hesitation, Bournemouth will lose nearly all its present beauty and advantages, while other rivals will rise, who—following the good ideas of the originators of the place—will profit by the example which Bournemouth was the first to set, but which, alas, it will have abandoned." (pp. 42-51.)

I hope this very valuable advice, given by a perfectly independent critic, will long be taken to heart by "those whom it may concern." (See Chapter IV., on "The Pine Woods.")

From the foregoing descriptions, and from my sketches of the coast and of the cliffs, it will be seen, as I have said, that nearly all the houses at Bournemouth have a certain elevation above the sea level. (See list of altitudes, p. 22.) There are very few exceptions to this. It would have been far otherwise if the space so wisely reserved for pleasure grounds, occupying the valley between the two cliffs, had been built upon. No doubt houses built there would have been very much "protected," and the few houses which occupy the lower levels on the banks of the valley are the most "protected" in the neighbourhood; but they lose in healthfulness what they gain in protection by being within the level of the valley mists in certain kinds of weather.

But no recent houses have been built so low down. All the new houses are either on the cliffs or on the high level sides of the valley, above all chance of mist, and yet obtaining some "protection" from the banks and plantations at their backs—their fronts being freely exposed to sunshine and fresh breezes.

It is important in selecting a house to bear in mind the season for which it is required, and the hour of sunset for that season, and to calculate from it the number of hours to which the house will be exposed to the sun's rays. Supposing, for example, that a house has a south-west aspect and a grove of trees or tall evergreens in front; when the sun sets at 8 P.M. the trees may be of no consequence, or may even afford a beneficial screen to keep off some of the glare; but it will be very different when the sun sets at 4 to 5 P.M., for in that case it will be too low to shine above the trees before it gets into the south and west, and thus the house will be left in gloom the greater part of the day. For an invalid's winter residence it is of great importance to obtain the longest practicable period of sunshine at all portions of the day, but especially should it be obtained as late in the afternoon as possible, that is, from the south and west. But morning sun is also desirable, and care should be taken that the anxiety most invalids feel to be protected from east winds does not lead them to choose a house that is also protected from the eastern sunlight.

The following directions given by Dr. Scoresby Jackson* are very judicious :—

"The most desirable aspect for an invalid's residence is that in which the warmth and light of the sun are enjoyed during the longest period *on a winter day,* and one which at the same time is protected from the influence of noxious winds. Dampness, the especial bane of all delicate constitutions, should be guarded against by choosing a somewhat elevated situation, upon an inclined surface of sandy or gravelly construction; and, with the same object in view, ponds, lakes, and marshes should be avoided. If, however, in spite of these precautions, there be the least suspicion of dampness on the walls of the house, the upper apartments alone should be occupied. . . . In addition to other requisites, it is essential that the house have near it a fitting place for out-door exercise." (p. 34.)

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* "Medical Climatology," etc. By R. E. Scoresby Jackson, M.D., F.R.S.E., etc. 1862.

An excellent new "Plan of Bournemouth, from the Ordnance Survey, Estate Maps, and other Available Data," has lately been published, from which I copy the following list of altitudes of the principal localities, revised and supplemented by Mr. H. A. Garrett, the author of the "Plan":—

	Feet.
Lowest Level of the Bourne	6·92
Lowest point in Bourne Valley	10·18
Belle Vue Hotel, opposite the pier	21·70
Bridge over the Bourne, Cambridge Road	29·30
Highest point in Bourne Valley	35·11
Exeter Road (Sunnyside)	54·30
Westover Road	46·20
Congregational Church, junction of Richmond and Branksome Wood Roads	51·80
St. Stephen's Road (at Ferncoombe)	55·30
Exeter Hotel	56·30
St. Peter's Church	60·90
Highest point in Branksome Wood Road	75·00
Bath Hotel, East Cliff	75·70
West Cliff Promenade at Durley Chine	108·00
Highcliff Mansions Hotel	115·00
West Cliff Coastguard Station	116·00
Highest point at Boscombe Hill	121·60
Streate Place, junction of St. Peter's Road, Gervis Road, and Bath Road	122·00
St. Paul's Church, near East Station	122·40
Near the entrance to the Cemetery, Wimborne Road	124·20
Highest point in Dean's Park	124·40

	Feet.
Junction of Christchurch Road and St. John's Wood Road, East Cliff	125·40
Top of Richmond Hill	125·80
Highest point on West Cliff	127·80
East Cliff Promenade	128·00
Highest point on East Cliff, corner of Meyrick Road	129·30
Highest point in Poole Road, near Bourne Hall	130·80
Back of Cemetery, Throop Road	134·90
Hume Towers, Branksome Wood Road, end of Talbot Woods	137·60
Talbot Woods, Wimborne Road end	139·00

The general view which I have now given of the configuration of the site on which Bournemouth is built, and of the way in which that site has been utilized, goes far to explain the freshness, softness, moderate humidity, absolute freedom from dampness, and general characters of its climate.

The most potent of all for good are the antiseptic and balsamic emanations from the pines, and the quality of the soil. Without these all the other characteristics would fail to give the climate its peculiar advantages for invalids, and with these it would be very difficult to destroy them—for their influence is all-pervading and invincible. (For full accounts of the antiseptic and balsamic properties of the air, and the nature of the soil, see Chapters IV. and VIII.)

In the description of Arcachon, which I have quoted, the writer says, "And yet the height itself is no more than a sand-hill, or rather a series of sand-hills." It is much the same with Bournemouth; sand, sand, sand, everywhere, so porous and so light that water falls upon it as upon a fine sieve, and is gone with surprising rapidity far beyond the reach of any evaporating power on the surface. So that *ground mists become impossible.* But geologically the structure of the sand-hills on which Bournemouth is built is very different, and much more interesting than that at Arcachon.

Arcachon is veritably a sand-hill and nothing more—a mere "dune," a heap of drifted sand. But the site of Bournemouth belongs to a distinct geological formation, generally known as the Bagshot Sands. (See Chapter VIII.)

In a letter from Mr. H. Smith Woodward, of the Natural History Department of the British Museum, who knows this district well, he says: "The whole of the district for many miles round Bournemouth is, so far as I am aware, covered with a deposit of very pervious gravel, except where streams have cut the valleys and 'chines' through it. Beneath this superficial covering, the thickness of which in different parts can easily be seen by visiting the diggings of foundations, etc., there is a series of lenticular beds of sands and clays, the former predominating.

"The surface gravels are Pleistocene deposits; the underlying beds are Lower Tertiary (Middle Eocene), and celebrated in Geology as 'the Alum Bay and Bournemouth series,' in consequence of the abundance of fossil leaves and pines that are imbedded in the clays. I should think no more suitable foundation for a town could be desired, as far as drainage is concerned." As a matter of fact, the sand so far predominates over the clay, which only occurs in patches, that the latter is very difficult for an ordinary observer to find, except when examining very deep sections of the strata.

This is illustrated by Plate VI., an artificial section of the back of Constitution Hill, Upper Parkstone, where an immense pile of sand has been cut through in order to reach a patch of fine clay, which is being utilized for pottery. Such strata of clay are so limited in area, and so far below the surface, that they have no effect upon the porosity and dryness of the superincumbent masses of sand and gravel.

In addition to the characteristics mentioned by Mr. Woodward, there is an interesting and peculiar one, consisting in a thin layer of finely powdered granitic drift, scattered widely over the surface high up on the cliffs and down in the valleys, and which has no relation to any of the local geological formations, and was probably imported from Devonshire (its nearest natural source) during some tremendous inundation, which poured it over the surface of the geological formations of Hampshire after they were complete. Where this exists it simply adds to the lightness and porosity of the soil.

I was curious to know to what extent the sands of which the Bournemouth cliffs so largely consist resemble in lightness the recently thrown up sand on the beach. I therefore procured specimens (*a*) of the sand on the beach; (*b*) from the top of the cliffs; and (*c*) from some portions of the deep strata exposed in the chines; and I got Mr. S. Hardwick, a very scientific and painstaking chemist, to submit them all to the same amount of drying in a water-bath, and then to take their specific gravity. It was found in all to be 1002·5—water being 1000.

Mr. J. Starkie Gardner, F.G.S., the greatest living authority on the Geology of the Bournemouth district, writes to me, October 14, 1884:—

"The subsoil of Bournemouth is, practically, clear silicious sand, uncontaminated even with fossil organisms. On the east the sands extend to the river at Christchurch, and *no clay whatever comes within, I should think, fifty feet of the surface.* On the west there may be an occasional, but very slight outcrop of clay near the surface here and there, but as a rule the patches of clay are small and deep down.

"You would be perfectly right in describing it as a formation of clean quartzite sand, similar to that on Bagshot Heath, with no mixture of clay on the east cliff, and very little on the west until Poole Harbour is reached."

The immense importance of this singularly light, gravelly and sandy soil as the site of a health resort is recognised by all authorities. Thus Dr. Scoresby Jackson says:—

"It is an important matter to be acquainted with the physical and chemical properties of *the soil of a country*, and to have a knowledge of its general geological conformation, as well as of its mineralogical productions. The temperature of a locality depends greatly upon the capacity of its soil for heat. Some kinds of soil are much more readily heated than others. Lands which admit of a rapid percolation of water are more healthy than others which emit all their water by evaporation, giving rise, at the same time, to a diffusion of gases through the atmosphere which render it unwholesome. Clay lands retain water and are cold; hence the necessity for thorough draining in such soils, by which means the climate is changed and improved. Chalky soils are also cold, but usually dry. *Sandy or gravelly grounds are accompanied by dryness and warmth,* and the more barren they are the fewer vapours they yield. They are indeed the counterpart of marshy soils."* (p. 10.)

And Mr. Scott says: † "The effect of *solar radiation* varies with the nature of the surface on which the rays fall, being least on ice or water, and *greatest on a sandy soil.* . . . . In proportion as the ground is covered with or permeated by water is the effect of solar heat in warming it reduced, for a large proportion of the heat which reaches it is employed in evaporating some of the water, and is therefore rendered latent. . . . . (p. 60.)

"The immediate effect of evaporation is to lower the temperature of all bodies in the immediate vicinity of the spot where the process is taking place. The reason of this is that a large quantity of heat (the latent heat of evaporation) is required to convert the water into vapour; it is necessary that this heat *should be available,* and the only possible sources for it are the surrounding bodies; . . . the evaporation from the coating of the wet bulb thermometer lowers the temperature of that thermometer.

"The loss of temperature over a given surface is of course proportional to the amount of water evaporated over that surface, *so that the drier the soil, the less is the fall of temperature produced by evaporation from it,* because the less is the amount of water present in it and available for evaporation." (p. 97.)

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* Scoresby Jackson, Op. cit.

† Scott, Op. cit.

In writing of the effects of the surface of the soil on air, Dr. Angus Smith ("Air and Rain," p. 507), says: "If soil affects the atmosphere, how does it happen that it is such an excellent disinfectant? Substances are not purified in the air to the same extent in the same time as in the soil. The great amount of surface in the porous soil is the cause of the rapid action mainly, but the acid humates, and probably other substances, act chemically. There are modes of oxydising in the air beyond the power of ordinary oxygen . . . . but even these require great time and space. If we throw sulphuretted hydrogen water or its compound with ammonia on a few inches of soil, it passes through, oxidised in a few minutes; we obtain such an action in the air only in great volumes."

"The character of the soil," says Mr. Scott,* "is also a most important factor in the salubrity of a locality. If the soil is light and sandy, so as to allow of the rapid removal from the surface of the rain-water which falls on it, the climate is far drier than can ever be the case in close clay soils." (p. 344.)

"To show the height to which the temperature of a dry, sandy soil may rise under the action of the sun's rays, it may be stated that Sir John Herschel observed a superficial temperature of 159° Fahrenheit, in such soil at the Cape of Good Hope; and Sturt says that on the banks of the Macquarie River, in New South Wales, 'the ground was almost a molten surface, and if a match fell upon it, it immediately ignited.'" (p. 45.)

In an article on the sandy soil of Arcachon, the *Lancet* says, November 1, 1878:—

"The sandy nature of the soil ensures the rapid disappearance of every drop of moisture from the ground.

"If the rain were not abundant, the cultivation of the soil would be impossible, and an arid desert would replace the verdant and blooming district of which Arcachon is the centre; for the soil is pure sand and nothing else, and this sand it is said extends to a depth of 50 metres below the surface of the ground. The surface is uneven, the sand having been originally blown into mounds and hillocks of moderate height; and this fact, while it adds immensely to the beauty of the country, encourages surface drainage and permits a very varied choice of building sites as regards aspect, etc. The prevailing tree is the pine. . . .

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* Scott, Op. cit.

" The absence of any snow-clad mountains in its immediate neighbourhood seems to protect Arcachon from those extreme degrees of cold which are common in such places as Nice and Pau. . . .

Dr. Parkes says:*—" The drainage of land so as to carry off water readily, and thus to make both ground and air drier, has a great effect on public health. . . . .

"The movement of the ground water, which by its rises and falls influences the moisture and the amount of air in the soil, and, through these conditions, alters the amount and rapidity of decomposition therein, has been supposed also to influence health, and to be especially connected with the development of typhoid fever, cholera, etc. A moist ground is also believed, on tolerably strong evidence, to be favourable to the production of destructive lung disease; and there is no doubt that rheumatism and catarrhal affections are more common in damp soil." (p. 1274.)

After a long course of investigation, somewhere about the year 1863, Mr. Middleton, of Salisbury, and Dr. Bowditch, of Boston, U.S., coetaneously came to the conclusion that " wetness of soil is a cause of phthisis to the population living upon it."

This important discovery was afterwards elaborately and lucidly worked out by Dr. Buchanan with his characteristic industry, and constituted the subject of his report to the Privy Council (Ninth Report, 1866). It has been so often confirmed by subsequent experience, that it has taken its place amongst the most generally admitted facts in the etiology of phthisis.*

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* " A Dictionary of Medicine." Edited by Richard Quain, M.D., F.R.S. 1882.

The first qualification, therefore, for a health resort for persons disposed to pulmonary diseases, or already suffering from them, is *an undoubtedly dry soil*—a soil not only pervious to water at its surface, but so deeply pervious that percolation may rapidly take the water falling on the surface beyond the reach of evaporation, and provide numerous conduits by which the water after leaving the surface may flow away.

Such is the quality *par excellence* of the soil and site of Bournemouth, as shown in my sketches of the sections of the East and West Cliffs, and of the back of Constitution Hill, (Plates II., III., and VI.), and as described in more accurate geological detail in Chapter VIII.

The peculiar effect of this *special feature of the soil upon the special quality of the air* of Bournemouth is not less simple than marked, and renders "*dampness*" impossible.

Dr. Radclyffe Hall lucidly stated the question of Latent Humidity, Dampness, and Sensible Dryness in the following passages of his work on Torquay:—†

"The quantity of moisture in the air at any given time and the *dampness* of that air are far from being the same thing. In summer, when the air is bright, clear, and dry, it in reality contains more moisture than in winter, when it *feels* more moist. The explanation *is that warm air can contain more watery vapour in an invisible form than cold air.* So long as the watery vapour is invisible, and not perceived as moisture, so long *the air is not damp.* Moisture in this shape may be styled latent humidity.

"But when the air is so full of latent humidity that the smallest lowering of temperature causes it to begin to be precipitated *the air is damp.*

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* See "British Medical Journal," October 26, 1872; May 10, 1884; June 7, 1884.

† "Torquay, in its Medical Aspect as a Health Resort for Pulmonary Invalids," By C. Radclyffe Hall, M.D. 1857.

"The measure of dampness then is the nearness of the amount of the watery vapour, which, more or less, is always present in the atmosphere, to the point at which it begins to be precipitated in a sensible shape. Consequently, the greater the removal from the point of saturation, the greater the dryness. The point of saturation is the dew-point. Hence the distance between the temperature of the air and the temperature of the dew-point is the measure of sensible dryness [*e.g.*, if the temperature of air is 60° and the dew-point 60°, there is complete saturation; if the temperature of the air is 60° and dew-point 50°, there are 10° of dryness].

"An air with ten degrees between the two is therefore drier than an air with nine degrees, or any smaller number. But the sensible dryness is not always a measure of the real dryness. In a hard frost the air may be saturated with moisture, but from its low temperature *it is a much drier air* in its effects upon our bodies, owing to the circumstance that it requires to be much more warmed up when in contact with either skin or lungs than usual; and therefore the humidity which saturated it when at 32° is far from doing so when it has been raised up to 98°, our natural temperature. Hence a frosty air, though *saturated* with moisture, is always a dry air, whilst summer air, which is not near to the point of saturation, is a much moister air, though its moisture is in a latent form. Consequently a place may, from being more uniformly warm, contain more latent humidity in its air, and yet possess a drier air, as regards freedom from *damp or sensible* moisture, than another which shall be damper, and yet possess less of actual humidity in the atmosphere.

"The *sensible dryness* is measured by the number of degrees of difference between the mean temperature of the air and the mean temperature of the dew-point.

"The actual amount of *latent humidity* contained in the air is measured by the number of degrees at which the dew-point stands. *When the dew-point is high, the quantity of latent humidity is great,* whatever the sensible dryness may be. *When* *the difference between the mean temperature and the dew-point is considerable, the sensible dryness is great,* whatever the actual amount of latent humidity may be. But the converse does not hold good to our feelings, since, when the difference at a low temperature (*e.g.*, frost) is very small or none, the air *feels* dry, though in reality it is at, or close to, the point of saturation for that temperature."

"By comparing the degrees of dew-point in the tables of comparative humidity, the amount of absolute moisture contained *in a latent form* in the air of the different places. . . will be seen. By noting the degrees of difference between the dew-point and the mean temperature, the sensible dryness will be obtained. The higher the figure of difference, the greater the dryness. The lower the figure of difference, the nearer the approach to dampness." (pp. 128-130.)

If the air, like sea air, contains a high degree of latent humidity, and the soil is very porous and absorbent, the moisture deposited as dew by condensation on the cool earth will not appear "as *dampness*" because it will disappear in the porous soil; and thus all the benefits of softness of air by latent moisture will be obtained without any of the disadvantages of dampness.

At Bournemouth the latent moisture inseparable from sea air is moderated by having to rise to the top of the cliffs (see Plate I.), while the porous sand (see Plates II. and III.) absorbs and percolates away all condensed moisture, and keeps the air fresh and free from emanations from the soil, precluding the possibility of dampness; while the Rain-traps catch the threatened storms (see Plates I. and IV.).

These phenomena are explained in the following passages from the works of Mr. Keith Johnston and Mr Scott:—

"One of the most important of the minor conditions that guide the distribution of moisture, is the *Relief of the Land.* Whenever any height intercepts the movement of a current of moist air from the ocean, the obstructing slope, wedging the air up into the cooler strata of the atmosphere, condenses the moisture." * (p. 141.)

"A *south-west wind,* for instance, may *blow over a flat country* with a clear sky; but as soon as the air reaches a hill side and is *forced to ascend,* the moisture it contains is condensed, clouds are formed, and rain is frequently the result. . . . The three great agencies which are efficacious in bringing about precipitation of moisture have already been stated: ascending currents; the contact of air with the cool surface of the ground; and the mixture of masses of air of different temperatures. I shall now touch on the several factors which influence the distribution of the fall.

"Of these the wind has to be considered first. Winds moving from high to low latitudes are generally dry; those moving in the opposite direction are generally damp. *Winds blowing from off the shore* on to the sea surface, especially if the coast be bold and the land elevated, so that the wind is forced to *descend,* are essentially dry, the action being similar to that which gives its character to the Föhn of Switzerland; while winds blowing from the sea *deposit their moisture on the coast.*

"As already explained, this action is only, in a very slight degree attributable to the contact of the warm air with the colder surface of the ground, for such an action can only affect directly the lowest strata of the atmosphere, unless very high mountains line the coast. The real cause is to be found in the enforced transference of the air *into higher and therefore colder levels.* . . .

"The western districts of the globe . . . . are exposed to westerly winds blowing over an extensive tract of ocean, and depositing their *moisture on the first coast they meet.*" (pp. 324-5, 361.) †

I have no doubt that the expression "smiling Bournemouth," so common in visitors' mouths, as descriptive of its

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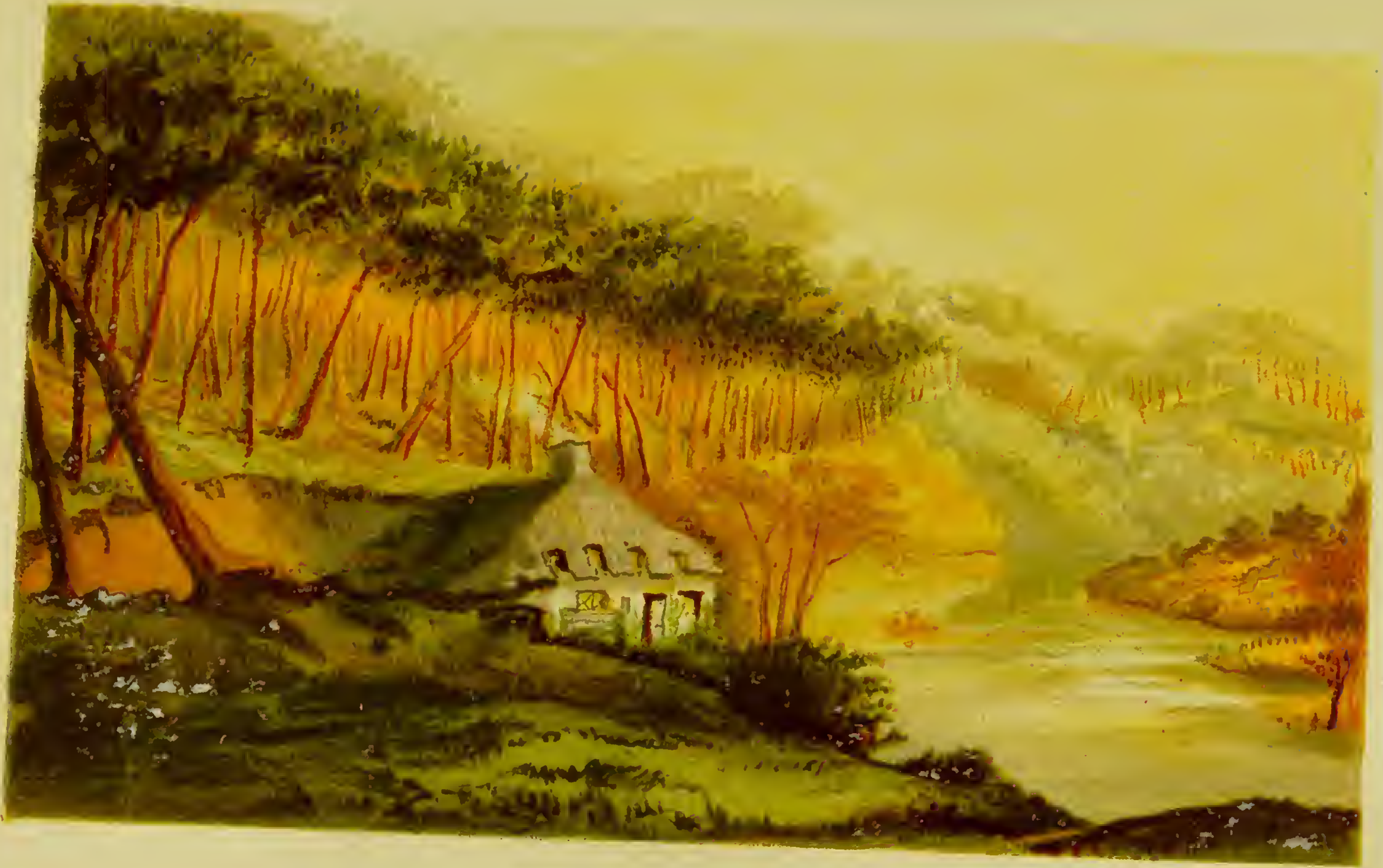
* "A Physical, Historical, Political, and Descriptive Geography." By Keith Johnston, F.R.G.S. 1880.

† Scott, Op. cit.



A FERRY ON THE STOUR, NEAR BOURNEMOUTH, MAY 1, 1885, SHOWING THE ILLUMINATION OF THE PINES BY A FLOOD OF SPRING SUNSHINE.

PLATE A. (*To face p.* 66; *see also p.* 35.)

cheerful brightness, is to a large extent due to the effects of what I have called the Rain-Traps. To these the rain-clouds drift as soon as formed, greatly to the disgust of the gardeners, who see their hope of rain disappointed, as the clouds which seemed bound to fall upon Bournemouth, rush off to the Purbeck Hills, to Hengistbury Head, the Isle of Wight, or to the wooded hills of Herne, leaving Bournemouth all beaming with sunlight smiles, and the gardens at the mercy of water-taps and garden-engines.

Dr. Henry Bennet, when endeavouring to explain the peculiar quality of the air of Mentone, which he had so long studied, pointed out that it was accounted for by the moisture of the sea breezes being thrown back upon Mentone during the day by the amphitheatre of mountains by which it is surrounded, thus keeping the air charged with the vapour of water, and partly veiling the town from the hottest rays of the sun during the middle of the day. Thus "Bradshaw's Dictionary" for 1882, says:—

"There is a peculiar condition connected with the climate of Mentone, which Dr. Henry Bennet was the first to point out. *The moisture-laden seabreeze*, which is drawn in daily by the sun's heat in sunny, cloudless weather, is arrested by the amphitheatre of mountains" (the coast line of mountains rise to an elevation of 4,000 feet or more, and recede so as to form a sheltered amphitheatre) "which it cannot get over. The colder atmosphere of the elevated regions condenses its moisture, so as to form a haze over the landscape from about eleven A.M. These condensed vapours soften the atmosphere in an exceptional manner." (p. 111.)*

This is the "vapour screen" of Professor Tyndall. "The principal action of the vapour in the air, so long as it remains in the vaporous condition, is as a medium which restricts the access of heat to the earth from the sun, and also the radiation of heat from the earth into space. Tyndall expresses this by saying that a sheet of vapour acts as a screen to the earth, being in a great measure impervious to heat." (p. 113.)*

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* "B. Bradshaw's Dictionary of Mineral Waters, Climatic Health Resorts, etc." 1882.

I have no doubt that Dr. Bennet is right in his observations, though wrong in his deductions, if he claims for this state of things an unqualified good. It would go far to explain the objections to the Mentone climate, as well as its advantages, and to account for the "oppressiveness and debilitating influence" which so many invalids complain of.

It is far otherwise at Bournemouth, where there is no "amphitheatre of mountains" to drive down the moisture-laden sea-breeze upon the town; but in their place, the *barrier of cliffs below the town*, and sufficiently marked points of elevation east, west, and north, to form Rain-Traps, and catch the rain-laden clouds which otherwise might fall on Bournemouth (see Plates I. and IV.); while the remarkable soil absorbs and drains away the moisture of the sea-breezes, and prevents the possibility of ground mists from surface evaporation.

It is this combination of (*a*) moisture-laden sea-breezes coming in from the south; (*b*) diluted and partially dried as they are in the manner described, by condensation of moisture on the face of the cliffs, and by admixture with the upper, drier, and less saline atmospheric strata, as they rise to the tops of the cliffs; (*c*) the important chemical changes which take place when the watery vapour mixes with the terebinthenate emanations from the pines (see Chap. IV.); (*d*) the immediate absorption of all redundant moisture by the soil; (*e*) the dryness of the soil with the rapid percolation of the absorbed moisture to a great depth from the surface, and the numerous subterranean conduits by which it finds its way to the sea; (*f*) abundance of sunshine from the wide expanse of sky, and the catching of clouds by the Rain-Traps; (*g*) free circulation of fresh air in consequence of the houses being built upon an elevated plateau instead of under the cliffs or upon sea-level flats, and of the heathland character of the surrounding country, (see Chapter III., "Marine Cachexia"); and (*h*) the protection afforded by the pine woods:—which give the climate of Bournemouth at once its softness, its freshness, its purity, and its antiseptic properties—a combination peculiarly difficult to obtain.

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* Scott, Op. cit.

It is not easy to conceive any other combination of conditions by which to obtain (*a*) *anti*septic properties without the objection of over-dryness or other irritating qualities; (*b*) *a*septic properties without the objection of excessive cold; (*c*) a marine air without the objection of overcharge with saline ingredients; (*d*) a soft air without the objection of excessive moisture; (*e*) coast air without the objection of malaria, and without undue exposure to storms; (*f*) shelter without the objection of deficient atmospheric circulation; and (*g*) last but not least, a combination of the brightness and grandeur of the sea with the varied loveliness of the surrounding pine and rhododendron woods, heaths, lanes and glades; and further afield—but still within an invalid's drive—the picturesque and soothing river scenery of the gravelly bottomed, rapidly flowing Avon and Stour, with their salmon fisheries; the widespread rural landscapes towards Canford and Wimborne; and the wonderful views of distant sea and sky from the moorlands and fir woods of Constitution Hill. (See Plate V.). And all this within easy reach of home—a point on which Dr. T. More Madden, after a long and varied experience of climates in all parts of the world, has laid great stress.

"Facility of access," he says, "is a point of great importance in the selection of a climate for invalids. It is obvious that a patient should be sent to a place which may be reached by an easy journey, and that in case of need he may communicate quickly with his physician and friends at home.

"With few exceptions the localities resorted to in winter by consumptive patients are situated on the sea; and certainly this predilection is well founded, for such situations are more equable in temperature, being cooler in summer and warmer in winter, and less subject to sudden transitions or greater extremes of temperature than inland places." (p. 7.)*

NOTE.—For Meteorological Records, see Appendix.

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* "The Principal Health Resorts of Europe and Africa for the Treatment of Chronic Diseases." By T. More Madden, M.D., M.R.I.A., etc. 1876.

CHAPTER III.

MARINE CACHEXIA.

Unusual Freedom from Marine Cachexia in the Residents at Bournemouth—Description and Explanation of Marine Cachexia as seen in Coast Towns at Sea-level—Children at Bournemouth markedly Healthy—Relation of Malaria and Marine Cachexia—Peat Bogs do not produce Malaria—Idiosyncrasy and Acclimation—The Functions of the Liver, and the Influence of the Sea-coast—Derangements of Digestion, Lithæmia, etc., in relation to Marine Climates—Importance of regulating the Functions of the Liver and other Digestive Organs, in Diseases of the Chest—Illustrative Cases—Important Remedial Properties of Sea-air.

One of the first things that struck me, after coming to live permanently at Bournemouth, and to observe the characteristics of the health of residents, was their unusual freedom from that state of health commonly seen at coast towns, and which I have been accustomed to call Marine Cachexia (*mare*-κακος)—a condition not hitherto distinctively described or referred to in medical writings, but which is so familiar to me that I cannot doubt it is also well known to other medical men, although they have not differentiated it.

The shrewd observation of the late Dr. Radclyffe Hall seems, indeed, to have been directed to something of this kind even in so healthy a place as Torquay, for he says:—

"Invalids who bring pink cheeks with them usually become paler at Torquay, and a florid complexion is not the most common sign of *bien-être* amongst residents." (Op. cit., p. 73.)

"Persons who have resided in India . . . . in whom the enlarged and torpid liver seems to refuse its work, find, if they try it, that Torquay does not suit them. They lose their appetite, become thinner, yellower, and miserable in their feelings; and they improve after leaving Torquay." (Op. cit., p. 15.)

And Dr. Hassall says:—"It would appear that diseases of the organs of digestion are somewhat rife; and this is not only so in respect to San Remo, but the whole Riviera." (p. 227.)* Dr. Barety also, writing of Nice, says:—"The sea disagrees with all in whom there is either a disposition to dysentery, or biliary catarrh, or congestion of the liver."†

It is most nearly allied to malarious cachexia, with which it is not unfrequently combined, when it becomes a much more serious affection.‡ It belongs to that class of cachexia which is described by Dr. R. Douglas Powell as "produced by the presence of morbific agents, which have been generated within the body; those arising from defective elimination, as the uræmic and gouty cachexiæ, from defective functional activity of the kidneys and liver," and which produces "a chronic state of ill health, associated with impoverished or depraved blood arising from mal-nutrition, persistent loss of blood elements, or the presence of a morbific agent." (p. 199.)§

This Marine cachexia, which I have observed as the characteristic constitutional state in residents of coast towns and villages built on the sea level or on slopes rising from the sea, is singularly absent in the inhabitants of Bournemouth. It is strikingly absent in the children, and children—especially those of the poorer residents—generally show this cachexia very definitely in places subject to it. The condition in its most developed form becomes an hereditary constitutional tendency, and the defective homes of the poor naturally intensify the morbid influences. The poor children to be seen in and around Bournemouth are remarkably well developed, healthy, and good-looking—the healthiest I have seen at any seaside place; and it is well known that Dr. West, the eminent founder of the Children's Hospital in London, was so impressed with the beneficial effects of Bournemouth on delicate children, that he established a school for them, which has for years had a very great success. I have often sent delicate boys there and found that they did well.

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* "San Remo Climatically and Medically Considered." By Arthur Hill Hassall, M.D. 1883.

† "Nice and its Climate." By Dr. A. Barety. Translated with additions by Charles West, M.D. 1882.

‡ For a full account of the effects of malaria, see "A Natural History of Malarial Poisoning, Agues, and their Protean Vestiges, etc.; being the Experience of a Long Residence in an Ague District. By the Rev. Richard Bingham, M.A., late Rector of Queenborough. With an Introduction by Horace Dobell, M.D." 1879.

§ Quain's Dictionary. 1882.

This freedom from marine cachexia is a very important fact. It is amply accounted for by the extraordinary porosity and dryness of the soil, (see Chaps. II. and VIII.), the freedom from overhanging hills, the position of the houses, both of the rich and poor, on the cliffs—*instead of under them,* as in so many seaside places. Whatever advantages an undercliff built town may have in the way of shelter and back protection from certain winds are terribly overbalanced by the increased tendency to marine cachexia.

This disadvantage exists in greatest force when the space between the cliffs and the sea is flat and wide, the soil retentive of moisture, and when there are portions over which the sea *only occasionally* flows. In this case the morbid state takes the compound character of marine and malarious cachexia, and constitutes one of the most miserable conditions of low health — approaching that described by Dr. Aitken* as follows:—

"Sufficiently authenticated examples are now on record which prove the persistent pernicious influences of malaria, both on races of mankind and on bodies of men subjected to their influence for periods of time beyond six or eight weeks, and especially during a temperature above 60°. . . .

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* "The Science and Practice of Medicine." By W. Aitken, M.D. 5th ed.

"The characteristics of degeneracy as shown by paludal races and inhabitants of such regions, may be shortly summed up as follows:—A more or less intense state of cachexia, stunted growth, engorgement of the chief viscera, especially of the spleen, languor and inertia of all the functions—aggravation of ordinary diseases, the superaddition to them of lesions only explicable by the atony and diminished power of re-action of the nervous centres, and finally, a diminished longevity. The influence of the degenerating principle in the sphere of the intellectual and emotional faculties is no less remarkably manifested by the torpor of intelligence, the apathy, a kind of hebetude, passing on under some circumstances to a state of idiocy, and under all to the most extreme indifference." (Vol. II., pp. 1018, 1019.)

But as Dr. Aitken says:—"A study of the climatology and the diseases of the different quarters of the globe illustrates most clearly that the morbid conditions produced by certain pathological states, while they are of a fixed character, are more intense in their severity, more continuous in their development, and more prolonged in their existence in some places than in others." (Vol. II., p. 1020.)

"It is a fact that the usual localities in which paludal fevers abound are those in which the soil consists of mineral, vegetable, and animal matters mixed together in such proportions, and of such constituents chemically, as tend to absorb moisture *and retain it,* and subsequently to decompose. Such soils are known as alluvial." (Vol. I., p. 511.)

Dr. Parkes ("Medical Hygiene") thus sums up his account of the soils with the largest organic emanations:—"1. Alluvial soils, old estuaries, deltas; *peaty soils are much less malarious;* marshes overflowed *regularly by the sea are often healthy;* whilst the *occasional* admixture of salt water increases the emanations. 2. Sands, if there is an impermeable clay or marly subsoil; old water-courses. 3. The lower parts of the chalk, when there is a subsoil of gault or clay. 4. Weathered granite or trap rocks, if vegetable matter has become intermixed; such soils absorb both heat and water. 5. Rich vegetable soils at the foot of hills."

"It may be laid down as a general proposition fairly established by Mr. Haviland," observes Mr. Kingzett,* "that disease has a geography. He finds that certain districts are store-beds of particular infections, and he is able to trace a connection between such states and local conditions. . . . There does not exist an important river in England or Wales, *subject to seasonal floodings,* that does not flow through high mortality districts.

"These and similar facts brought forward by Mr. Haviland,† demonstrate that places exist where the local conditions are such as either originate or favour certain specific diseases. These conditions are no doubt very multifarious, and partly concern climatic influences, geological particulars, water supply, and so forth." (p. 79.)

Dr. Angus Smith says,‡ "There seems to be a confusion in many minds between peat bogs and marshes, but the difference is very great. No peat-bog gives out marsh-fevers and agues. . . . . The acid peat prevents decomposition, and so removes the results of putrefaction." (p. 520.)

This is an important fact in relation to Bournemouth, because it is well known that Bourne Valley was originally a peat-bog, and although now it is so completely drained as to leave no traces of its former state, persons unacquainted with the distinction imagine that the ground was once a marsh, which is a mistake.

It is only necessary to refer to Chapters II. and VIII. to see that the characteristics of the soil and position of Bournemouth are absolutely different from those conditions which dispose to malarious cachexia, and are as far as possible free from the conditions which produce Marine cachexia.

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* "Nature's Hygiene," etc. By C. T. Kingzett, F.C.S., etc. 1880.

† See a paper by Alfred Haviland, M.R.C.S.Ed., "Journal of the Society of Arts," vol. xxvii.; also his work on "The Geography of Heart Disease, Cancer, Phthisis, etc."

‡ "Air and Rain."

It must be borne in mind that the vulnerability to climatic influences is very different in different individuals, some falling easy victims to slight changes in their surroundings, while others have a singular resisting power. Thus Dr. Aitken says :—

"Individuals of races, pre-eminent among all others for capacity, for colonisation, and acclimation, are seen in all parts of the world, combating successfully climatic influences, mainly by adapting themselves to new conditions, *carefully regulating their mode of life, manners, and customs,* so as to suit the climate in which they live.

"This is the first and main point to be attended to in attempts at acclimation. Food, clothing, and habits must be regulated so as to conform to the wants of the climate of adoption." (Op. cit., Vol. II., p. 1015.)

But it is of the greatest importance not to shut our eyes to the tendency of prolonged marine residence to produce marine cachexia, even under the most favourable circumstances; because the early stages are represented by those derangements which occur to the majority of persons on first going to the seaside, *i.e.*, after a short residence, and if neglected or not understood then, the symptoms increase, more or less slowly and irregularly in different temperaments and constitutions, and account for a very large majority of the cases in which people think that any seaside place "does not agree," is "relaxing," "enervating," etc., etc.

In nearly all cases this unpleasant and disappointing effect can be easily combated by medical treatment; and when removed, it proves to have been really advantageous instead of the contrary, and is the prelude to the very best effects of change of climate.

In its simplest form, occurring in persons of fairly vigorous health, without complications, the essence of the whole thing is a *blood congestion of the liver,* which soon relieves itself by a profuse secretion of bile, thrown off either by sickness or diarrhœa, or both; after which the liver goes on acting with unusual freedom, accompanied by a decided improvement in health and vigour.

But when the liver is diseased or torpid in its functions, a slowly increasing *blood congestion goes on unrelieved by secretion;* all the digestive functions are disturbed, the formation of red blood corpuscles is arrested, those which exist disintegrate, and the blood becomes poisoned with the retained *débris* and with other matters which it is the function of the liver to eliminate; and, if excretion is not set up, such secretions as do occur, being morbid, produce a *morbid biliary congestion,* and the blood becomes still further poisoned by absorption from the hepatic cells and passages. Among many other symptoms of such general derangement may be enumerated those described by Dr. S. H. Ward,* as follows;—

"Deficient secretion of bile is characterised by dyspeptic symptoms, such as furred tongue, unpleasant taste in the mouth, loss of appetite and flatulence. The action of the bowels may be irregular, but is usually costive, and the evacuations are of a pale yellow, or drab, or whitish colour, and often of offensive odour. The complexion is usually sallow and anæmic, not often jaundiced. Disturbance of the circulation, in the form of languid or irregular pulse, and of the nervous system, as headache, languor, drowsiness, and hypochondriasis are frequent concomitants. The urine is generally dark-coloured, turbid, and loaded with lithates. *There is also, in cases of long standing, loss of flesh.* Indeed, the functions of the bile in promoting the assimilation of fat, in stimulating peristaltic action of the intestines, or as an antiseptic, are well illustrated in the symptoms which attend protracted deficiency of the secretion."

I may add that it is at this point in the symptoms, that marine and malarious cachexia so nearly resemble each other.

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* Quain's Dictionary.

For the further elucidation of this interdependence of the blood-making assimilative and blood-purifying processes, and hence the production or prevention of cachexia, upon the functions of the liver; and to refresh the memory of those who have not specially studied these relationships, I will quote some passages from a paper which I prepared with great care, "*On the Functions and Disorders of the Liver, and their management in accordance with the results of modern discovery*," published coetaneously in "The New York Medical Journal," and in the "St. Louis Medical and Surgical Journal," Dec., 1879.

"The importance of the liver in connection with our present subject may be considered under six principal headings:—

"1. Its connection with digestion and assimilation of the fat elements of food (hydro-carbons).

"2. Its connection with the digestion and assimilation of the saccharine and amylaceous elements of food (carbo-hydrates).

"3. Its connection with the digestion and assimilation of the nitrogenous elements of food (albuminoids).

"4. Its connection with the disintegration of nitrogenous matter.

"5. Its liability to congestion when the pulmonary circulation is obstructed in front, with consequent disturbance of its functions; this retrograde congestion and disturbance of functions extending in due course to all the organs which contribute to the portal circulation.

"6. The apparently anomalous and puzzling fact that fatty enlargement of the liver is especially apt to occur when all the rest of the organism is wasted by consumption.

"This remarkable combination of circumstances seems to invest the liver with so much interest in relation to loss of weight, blood-spitting, and lung-disease, that we are astonished to find how little is said about it in any of the existing works on consumption.

"If we take a bird's eye view of the organism—with its general plan of a venous system separated inviolably from an arterial system by the lungs; and a great food-supplying apparatus for the generation of blood and tissues, and for the evolution of heat and other modes of motion—the liver strikingly attracts our notice, as a huge machine placed as peremptorily between the food supply and the pulmonary circulation as are the lungs between the veins and the arteries, intercepting every particle of new food that can be absorbed by veins. So jealously is this shut off from the lungs, that the blood of the hepatic artery, after ministering to the nutrition of the liver itself, and even that of the vasa vasorum of the hepatic veins, is returned to the portal vein before it is allowed to reach the lungs.

"We cannot for a moment doubt, when we regard this imperative arrangement for interception, that it has some most vital purpose.

"The next thing that most forcibly strikes us in this bird's-eye view is a similarly peremptory arrangement, by which everything absorbable by lacteals and lymphatics is scrupulously kept out of the way of the liver, and, after passing through a system of glands, is conveyed by the thoracic duct directly to the lungs.

"And again we are struck by the definite arrangement by which all the venous blood of the body, other than that charged with new food, is, like the contents of the thoracic duct, kept out of reach of the liver, and conveyed directly to the lungs.

"We find that, by these mechanical arrangements, all worn out tissues, all fats not absorbed by the portal system of veins, all the products of interstitial nutrition, are submitted directly to the pulmonary circulation, but that all the other elements of nutrition *must be submitted to the operations of the liver* before they are fit for use in the organism.

"What, then, are the effects of these important operations?

"1. First and foremost in every way is the conversion of the carbo-hydrates of the food, and probably some of the albuminoids, into a material called 'Bernardin,'* 'amyloid matter,' or 'glycogen.' It matters not by which of these names it is called, but I prefer the first, so that it is clearly understood that—from the time the food is converted into this body it becomes utilizable as a source of force and nutrition; and that—so long as the functions of the liver are normal, and the quantity of carbohydrate food introduced is not in excess of the maximum capacity of these functions—only a trace of sugar *per se* escapes conversion into Bernardin, and is allowed to reach the pulmonary blood—any excess of this being rapidly excreted by the kidneys, constituting diabetes.

"2. The second effect is the interception of so much of the fats as are absorbed by the portal system of veins (almost entirely oleine) for the manufacture of bile—only the surplus over and above what is employed for this purpose being allowed to reach the lungs by the hepatic veins. All the solid fats, and the bulk of all fats, are saved from the liver, being emulsionised by the pancreatic secretion, and conveyed to the lungs by the lacteal route.

"3. The albuminoid materials of food absorbable by the portal system of veins are disintegrated in the liver, leading to the formation of urea and other nitrogenous products, afterwards excreted by the kidneys. In the performance of this and other chemical processes, the liver becomes a great centre of animal heat, the temperature of the liver reaching 104° to 106° Fahr., when all the rest of the body is at 98° and 99°. It is important to remember that the blood of the portal vein, when it enters the liver, contains the blood from the spleen, and that probably in connection with this is the fact that the worn-out red blood discs are cast into the liver, forming part of that copious supply of nitrogenous matter poured into the liver, the disintegration of which has already been referred to as a source of animal heat, and in the course of which blood pigment is probably converted into bile pigment, and bile pigment into urinary pigment. It is not certain, however, that bile pigment and the biliary acids are not secreted from the blood of the hepatic artery. But, as I have already mentioned, the venous return of the hepatic artery is into the portal circulation.

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* After Prof. Bernard, the discoverer of this material (at the suggestion of Dr. Pavy).

"4. We come next to the special secretion of the liver, that rich, complex, abundant, and important fluid, THE BILE, poured out at the rate of about two pints every twenty-four hours, not less than thirty-nine-fortieths of which is returned to the blood during its passage through the biliary and intestinal tract, in the course of that great and important osmotic circulation constantly going on between the fluid contents of the bowel and the blood. The amount of fluid poured into the intestines and reabsorbed in twenty-four hours, says Professor Parkes, 'is almost incredible, and constitutes of itself a secondary or intermediate circulation never dreamt of by Harvey. The amount of gastric juice alone passing into the stomach and then reabsorbed amounted, in a case lately examined. . . . to nearly twenty-three imperial pints (if we put it at twelve we shall certainly be within the mark). The pancreas . . . . furnishes twelve pints and a half in twenty-four hours, while the salivary glands pour out at least three pints . . . . the amount of the bile is probably over two pints. . . . . The amount given out by the intestinal mucous membrane cannot be guessed at, but must be enormous. Altogether, the quantity of fluid effused into the alimentary canal in twenty-four hours amounts to much more than the whole amount of blood in the body. . . . The effect of this continual outflowing is supposed to be to aid metamorphosis; the same substance, more or less changed, seems to be thrown out and reabsorbed until it is either adapted for the repair of tissue or has become effete.'

"As regards that small proportion of the bile (not more than one-fortieth of the whole) which is excreted through the intestines, it acts as a potent antiseptic upon the contents of the bowel, stimulates peristaltic action, and in this way, as well as by giving a proper consistence to the fæces, assists in their regular discharge, and it rids the system of those waste products of blood and tissue which can no longer yield up nutriment or force to the organism.

It is a striking fact that all the digestive fluids, from the saliva downwards, promote decomposition until we come to the bile, which, for the first time, reverses the action, and interposes an antiseptic, thus maintaining the *status quo* of the proceeds of digestion until they are absorbed or cast off as waste, and staying the evolution of gases in the passage of this waste out of the body.

"In diseases *attended with copious expectoration* a special importance attaches to the antiseptic properties of bile; for it is inevitable that a considerable portion, in some cases the whole, of the matter intended for expectoration will pass from the respiratory down the alimentary tract, where it will decompose and act as a septic poison unless this is prevented by some antiseptic agent. I have laid so much stress in other parts of this work upon the vital importance of antiseptic treatment in tuberculous blood-poisoning, or tuberculæmia, that I need not do more in this place than call attention to this as another reason for promoting the proper flow of normal bile.

"It is—that large proportion of the bile (about thirty-nine fortieths) *which is reabsorbed*—with which we are more especially concerned in considering the *question of loss of weight.* We cannot fail to be struck with the consideration of how largely the nutrition of the body must be interfered with if, through faulty action of the liver, this enormous daily contribution to the new formative materials of the body is either cut off or ill elaborated, or if, after being duly elaborated and poured into the intestines, it is cast out of the body instead of being absorbed.

"But in addition to the direct supply of nutriment by the action of the liver, the bile has an indirect influence on nutrition equally important. Not only is its passage into the intestines in some way essential to that formation of Bernardin (amyloid substance or glycogen) out of the carbohydrates, about which I have already spoken, and instrumental in facilitating the digestion of the albuminoid constituents of food; but experiments have shown that the presence of a weak solution of soda or potass in the pores of an animal membrane materially *assists the passage through it of emulsionised oil and fat;* and we find in the alkaline bile, diluted with the other digestive fluids, exactly what is wanted to saturate in this manner the lining membrane of the alimentary canal, and thus to facilitate the important process of absorption of fat. There can be no longer any doubt that one of the great purposes of the liver is to assist by these means in the supply of fats to the blood by the lacteal route. . . . .

"But still we have not fully demonstrated or explained how it is that fatty liver so often progresses *pari passu* with the wasting of the rest of the body in consumption.

"This question has long been a stumbling-block both to physiologists and physicians, but I think that now we shall not find it difficult to answer. It, of course, involves a question which physiologists have not completely settled, viz., the mode and course by which the tissue fat is removed during the process of wasting—whether it is taken up by the lymphatics or by the veins. But there is no longer much room for doubt that the systemic veins are the principal channels by which fat is conveyed from the adipose tissue cells to the blood, while the lymphatics take up the worn-out tissue of the cells themselves. If the fat were all taken up by the lymphatics it would be conveyed directly to the lymphatic glands, and thence to the lungs, and none of it could be waylaid by the liver. That which is absorbed by the blood-vessels is conveyed by the venæ cavæ to the lungs, and thus the liver would still be eluded, were it not that, when the supply of fat to the pulmonary blood by the natural lacteal route is cut off or materially diminished, the call upon the adipose tissues for fat is so urgent that the blood becomes surcharged with absorbed tissue fat so long as any can be obtained, and this fat, not having undergone pancreatisation or elaboration in the glands, is utilised with difficulty, and therefore passes and repasses through the organism in the general circulation before it is consumed. In this way the arterial blood of the whole system, and therefore of all the chylopoietic organs, is surcharged with ill-elaborated fats, and as the venous return of all these organs is into the portal system, it is evident that in this way a constant overloading of fat is kept up in the liver cells while all the rest of the organism is losing it by interstitial absorption.

"If this were the beginning of the series of morbid phenomena in consumption, we might expect, from what we have learnt of the elastic character of the function of the liver as an interceptor of fat, that it might simply become a channel for the passage of absorbed fat to the lungs, as it is capable of becoming for a temporary purpose, when overtaxed with oil from the food; but we must remember that before emaciation begins the liver functions have been long taxed far beyond their healthy margin; the liver cells have already overflowed with oil and become choked with it, the portal circulation is blocked up, and the secretion of bile perverted or arrested.

"But, still more, as the stage of emaciation arrives, in the majority of cases, the digestive organs have been overflooded with fatty and amylaceous foods in attempts to keep up nutrition, by which all the functions of the liver have been overstrained and spoilt; *the powers of locomotion have become limited by illness; and in the necessary protection against colds, the patient has been shut in warm close rooms;* and thus the difficulty of maintaining healthy digestion and assimilation, especially healthy liver action, have been still further complicated. Hence we cannot be surprised when Dr. Warburton Begbie says, as the result of his large experience, 'the most fatty livers as well as the largest organs which have fallen under my observation have been in cases of chronic phthisis attended by extreme emaciation, in which cod liver oil, either in large or moderate amount, had been daily consumed for a period of many months.' And when we consider that, in the words of Rokitansky—'fatty liver is an essential constituent or pathognomonic combination of the tubercular dyscrasia, inasmuch as it *allies itself with tubercular affections of every kind,* with tubercle of the intestinal mucous membrane, of the bronchial glands, the serous membranes, the bones,'—we shall see that attempts so often made to explain the connection between fatty liver and phthisis, by referring it to the effect of interrupted oxygenation through the destruction of lung substance, are completely beside the question, even if they were not, *as they are,* easily controverted on other grounds."

In the paper already quoted I also referred to the connection between the hepatic functions and gout and rheumatism, thus:—

"I have pointed out the important action of the liver on nitrogenous matter, by which urea is formed and animal heat evolved; . . . . and as we know that the presence of an excess of uric acid in the urine is a sign of a defect in the oxygenation of the waste nitrogenous materials which ought to be disintegrated by the liver; when we find the urine overcharged with uric acid, our first care should be to restore or to increase the disintegrating functions of the liver, and thus to remedy the defect at the fountain head.

"In this way gouty and rheumatic affections and their attendant dyspepsia may be far more permanently treated by the administration of podophyllin, chloride of ammonium, benzoate of soda, ipecacuanha, and the like, than by merely resorting to antidotes for the over acid condition; *but it is usually advisable to do both.*"

It is unquestionable that one of the complications arising from change from an inland to a marine climate is that those disposed to rheumatism and gout, and to their allied affections of the skin, such as eczema, sometimes find their complaints—which may have been previously in a state of abeyance or suppression—suddenly brought into most unpleasant prominence soon after removing to the seaside. The conjoined effects of the marine atmosphere and its surroundings upon the liver and skin produce a condition of active Lithæmia. The appetite is often increased at first, and an unusual amount of nutriment is taken into the system, greater than the powers of digestion are able to contend with; the astringent effect of the salt air on the skin shuts in its secretions and throws them upon the blood, and, as I have already shown, in persons suffering from chronic pulmonary diseases, the digestive and assimilative organs are often already overloaded and overtaxed by the circumstances of their invalid life. The liver therefore becomes unable to contend with the demands made upon its functions, so that its important duty of converting nitrogenous matter into urea fails to be performed, and the blood becomes charged with nitrogenous waste, the potent cause of gout and rheumatism.

On this form of defective liver action, or as he prefers to call it, "disorder of the metabolic function," Dr. N. H. Ward says:—

"In reference to derangements from faulty functions connected with albuminous disintegration, etc., the writer quite concurs with, and will concisely state, the views advanced by Dr. Murchison. One of the immediate results of such faulty function is the non-conversion of nitrogenous matters into urea, and the production of lithates and lithic acid, inducing a condition of blood to which this authority fitly applied the term *lithæmia.* The lithæmia may be relieved for a time by elimination by the kidneys, showing itself in deposits in the urine, on cooling, of lithic acid, lithates and pigmentary matter. These deposits are not unfrequent in persons in good health, especially after any excess or error in diet; and they are more or less common in persons of a gouty habit of body, and in those who are predisposed to hepatic derangement, or induce it by habitual over-stimulating diet. These deposits may exist for years without causing much discomfort; but after a time the excessive quantity of lithic acid and lithates cannot be eliminated by the kidneys; and they accumulate, causing disturbances in the various parts of the organism, and giving rise to various more or less distressing symptoms. Of these symptoms, the more prominent are: epigastric oppression, flatulent distension of stomach or bowels, heartburn and eructations, sense of weariness and tendency to sleep after meals, furred tongue, unpleasant taste in the mouth, especially in the morning, appetite often good, sometimes the contrary, an excessive secretion of viscid mucus in the fauces and back of the nose, constipation and vitiated secretions. Palpitation, irregular or intermitting pulse, frontal headache, vertigo, noises in the ears, restlessness at night, irritability of temper, and hypochondriasis, are other symptoms that are not unfrequently present.

"Gout, whether openly expressed, latent, or irregular, is associated with the symptoms just mentioned, and is one of the results of lithæmia and of faulty hepatic function." (Quain's Dictionary.)

The peculiar immunity among the residents at Bournemouth from the Marine Cachexia, so commonly seen at seaside places, is explained by the healthy position of their dwellings on a dry, sandy plateau, high above the sea-level, where there is free circulation of air from inland as well as from the higher and less saline strata of the marine atmosphere, and by other circumstances connected with the climate fully discussed in Chapters II., V., and VI.

But we must remember that, notwithstanding all the great advantages which sea air undoubtedly possesses (see Dr. Weber's remarks, p. 64), it is impossible at any place on the coast to avoid entirely those influences which I have been describing.

And it is one of the things to be constantly borne in mind if we wish to see our patients thrive. This is a matter of especial concern to persons suffering from wasting diseases, and I have, in my work on "Loss of Weight, etc.," and in my paper "On the Liver," already quoted, shown how important a rôle the liver plays in maintaining the nutrition and weight of the body. It is of the highest necessity, therefore, that its functions should be kept in a normal and active state, especially when such persons, while unable to get much exercise, are obliged to take large quantities of fattening medicaments and foods. Many of my old patients will remember that it was my custom, during my London practice, to prescribe a "Liver-dose to be taken on the third night after removal to the seaside; and to be repeated about once a week," and I have again and again been thanked for the great advantages derived from this course.

Judiciously looked after, the sea may be made use of for the advantage instead of the disadvantage of the nutritive processes, but its influence on the Liver certainly needs to be constantly watched in the majority of patients. So much is this the case that, when asked whether a marine climate will agree with a patient, we may almost always give the answer which "*Punch*" gave to the question "Is life worth living?" viz., "That depends upon the liver!" and with the same *double entendre* in our minds.

Fortunately there are no functional disorders or organic diseases for which modern scientific medicine has provided more efficient remedies than those of the liver and digestive organs. And if we employ these with skill and judgment, we may find the liver a most powerful ally, instead of a dangerous enemy, in our treatment of diseases of the chest.

A certain number of patients suffering from diseases of the liver and digestive organs, have come from various parts of the country for the purpose of consulting me at Bournemouth, and have remained here in order to be near to me, not from any idea that the climate would be of service to them, but rather with a fear to the contrary. Notes of some of the more serious of these may here be introduced, to show that, at least, *the climate did not prevent their successful treatment.*

Case I. Mrs. ——, æt. 65, from Lancashire. The following account was given by letter before the patient arrived :—

" Mrs. —— suffers from an inactive liver, and considerable enlargement of it. Three years ago she passed very large gall-stones, the size of small walnuts, and in consequence had severe and obstinate jaundice. The effects never seem to have passed off. The gall-stones, from their size, had to force a passage for themselves into the small intestines. After the jaundice, she was subject to chills and feverish attacks, causing some hours of severe pain at the back and general illness. She is now very sensitive to cold winds, and the irritation of the skin, which is very bad, has never left her since she had jaundice. She has been to Carlsbad for three seasons, with no marked improvement . . . but this year the waters seem to have left some improvement . . . but from being quite stout, she has become very thin, and her skin is of a greenish-yellow colour. . . . She says that a strong sea air never agrees with her."

She came to Bournemouth, to consult me, December, 1883, and decided to stay under my care, and remained till May, 1884. I found the liver full and hard, the left lobe stretching across the epigastrium, beyond the opposite ribs, and about half-way to the umbilicus, the rest of the liver reached nearly to the umbilicus and to the upper margin of the sixth rib. The urine contained bile ; the skin was deeply tinged of a greenish-brown, not orange or black ; conjunctivæ slightly tinged, of dirty yellow ; irritation of skin exceedingly distressing from the presence of bile ; no pain ; great debility and emaciation. I put her upon Succinate of Iron to dissolve cholesterine and restore blood corpuscles ; minute doses of podophyllin dissolved in spirits of wine every night ; pancreatine after all food; glycerine and borax to the skin; Vals water, and good general diet. This treatment very gradually, but steadily, removed all symptoms, and, with the assistance of the climate, completely cured her.

May 25th, she wrote:—"Day by day have I felt thankful for the good I gained while under your care. My long journey did not upset me. . . . . I continue to improve; and my husband and all my friends are surprised and pleased to see me so much like my old self. . . . . My husband begs me to express his thankfulness for what you have done."

The treatment was continued, by my wish, till August, when the family doctor wrote me, August 24th:—

"I visited Mrs. —— yesterday. I found pulse good; tongue clear; appetite good; skin cool, although yellowish, much less so than when I met her on her return from Carlsbad. The lips are now red; and the general look one of improved health, flesh, spirits, and strength. The urine light straw colour, and a drop placed on a white plate in contact with nitric acid exhibits no change. The motions are more or less yellow and bilious. On percussion over the hepatic region, there was no dulness in a line with the right nipple beyond and scarcely to the margin of the ribs. . . . The dulness extended quite to or beyond the margin of the ribs behind, and there seemed about a finger's breadth of resistance below the margin. In the epigastric region there was dulness, and some portion of the liver could be felt, but no tenderness. No ascites, and abdomen about normal fulness. She has now discontinued the succinate of iron, but will resume it if she feels to lose ground." October, 1884: "There has been no return of jaundice; health keeps good. Her only complaints are of muscular rheumatism in the neck and arms."

Case II. April, 1884. Mr. ——, æt. 41. Had lived chiefly in Sydney till three years ago. His London doctor wrote me:—"He is just now suffering from looseness of the bowels, two or three stools in the early part of the day. . . . He had a similar attack, lasting three weeks, in November, 1883, and one which lasted two months, and left him in January, 1882, on taking a trip to the Mediterranean. At that time, I was afraid he had some ulceration of the colon . . . . The evacuations are fluid, or semi-fluid, containing plenty of bile, but are frothy; no great excess of mucus. I do not think it well for him to be long without medical supervision."

I found that in Australia he had been subject to colic, and eight years ago, in London, under Dr. Cotton, he had an obstinate attack of "spasms in the stomach, with extreme purging."

No organic disease was detectable, and his urine was normal, with the exception of depositing pale urates.

I wrote his doctor that I did not think there had been or was ulceration anywhere; that the origin of the complaint was in the later processes of stomachal and duodenal digestion, by which irritating *débris* of food were allowed to pass into the intestines. I prescribed only reasonable caution in food, adjusted his times for meals to suit his occupations, mixed and generous diet, pancreatine after all food, and a dose of Dec. aloes co. each night, to clear off *débris*, if any remained.

He soon got quite well, the action of the bowels normal, and he returned to London. His doctor wrote me, May 9th :—"Your treatment has certainly done him good, and your view of the case seems to explain all his symptoms."

In August, 1884, he again came to Bournemouth to consult me, having been very ill in London, with his old symptoms both of pains and diarrhœa, which had much worn him down, and made him very anxious. Consultations had been had with several leading physicians, and the last resulted in an opinion that he had "eczema of the mucous tract of the bowels," for which he was put upon a restricted fluid diet, No good resulted from this, and when he came to Bournemouth his looseness was very troublesome, preventing him from leaving home with comfort, even for a drive, and he suffered much inconvenience from the fluid and restricted diet.

I found that, after leaving me in May, he had continued so well that all my remedies were left off; and when he again began to suffer—instead of resuming them—first one remedy and then another had been tried, and thus he had "lost touch" of his case. I again most carefully examined him, taking into consideration the important opinions he had received, with the result that I again wrote his doctor that I was confirmed in my former opinion. I put him on solid, generous diet as before, each *meal being followed by a good dose of pancreatine,* to be repeated every hour if any indigestion symptoms occurred; to take a teaspoonful of castor oil every night; and after the first action of the bowels to chew half-a-dozen cloves, swallowing the juice; and if the bowels acted again, to take a little brandy. This simple treatment was absolutely successful: he had no trouble at all in keeping free from diarrhœa; he ate and drank well; and as the weather was hot and lovely, and he had brought with him a mail-phaeton and a pair of good horses, he lived much in the air, riding and driving, and had no trouble from his bowels. I advised him to continue his oil at night and pancreatine after food for six months, before he considered his cure substantiated; but the cloves he soon gave up as no longer needed.

Certainly, in this somewhat threatening and troublesome case of affection of the digestive organs, the climate of Bournemouth, even in the hottest period of this tropical year, if it did not help the cure, did not stand in its way.

Case III. In the spring of 1884 I was asked to visit a distinguished Wiltshire doctor, who had come to Bournemouth to consult me, but was too ill to leave his bed. In a letter, Nov., 1884, referring to this illness, he says, "In the autumn of 1882, I had a severe attack of lithiasis. . . . I inherited gout from my maternal grandfather, and once, about ten years ago, had an unmistakable gout in my right great toe, which disappeared in a few hours, and has never returned. . . .

I have led a notoriously abstemious life, and for forty years carried on unassisted a very laborious practice. . . . . In the spring of 1882 I had a severe attack of jaundice, with congested and enlarged liver. . . . . In the spring of 1884 I had another severe attack of jaundice, with severe and continued indigestion and lithiasis. I was three weeks in bed; the liver was enlarged, and the evacuations persistently white. I went to Bournemouth when I thought I was recovering, but fell ill the day of arrival, and was confined to my bed for a fortnight with the same indigestion, jaundice, and white stools. Nothing seemed to change the character of the stools till you gave me euonymin, which changed the stools from white to gamboge colour. I then rapidly got better. . . . , I am seventy-three years of age, walk three miles a-day, and work gently from ten till six. . . . There can be no doubt that on my visit to Bournemouth I got well under skilful treatment; therefore the air of Bournemouth could not have been injurious to a man with lithiasis, jaundice, and congested liver."

Case IV. Jan., 1884. Mr. ——, æt. 42, a London publican, consulted me at Bournemouth—where he had been a few days. He was tall and gaunt, in a miserably cachectic condition, coughing badly, hardly able to bear examination from debility, no appetite, symptoms of subacute gastritis from alcohol. Liver just down to umbilicus and up to nipple, not nodulated but tender, and no jaundice. Urine loaded with lithates and purpurates, scanty, no albumen, motions black. Had gout in both feet two months ago, and several attacks before. Father gouty. Cough since the gout two months ago. Some effusion into right pleura, upper lobes on both sides, from apex to nipple, full of large crepitation back and front, but especially in front, almost amounting to gurgles, and resonance impaired, but not absolutely dull. I thought he was on the eve of breaking up with alcoholic phthisis. But he rapidly mended under the changed "conditions of existence" (see Chapter V.), careful dieting, eliminants, counter-irritation, etc. The weather being fine, I had him driven out in a closed carriage, daily; whereas at home he had been keeping himself in close, hot rooms, and in six weeks, very much to his surprise, and I may say to my own, he returned home, having regained his standard weight, no effusion left, his liver smaller, his motions normal, the lungs free from crepitation, the defective resonance clearing. He ought to have remained longer, but business called him away.

Case V. Colonel ——, æt. 36. Had come to Bournemouth with his family for the sake of a delicate child.

January, 1884.—Very tall and thin; said to have good health till return from Egypt; now has very severe lumbo-sciatic rheumatism and neuralgia. Ham-strings very painful when sitting, and gets stiff in the back and legs if long in one position; very little sleep in consequence of pain; troublesome hæmorrhoids; hands cold and blue. General malario-rheumatic cachexia.

His friends objected much to his staying at Bournemouth, from an impression that it would be "too relaxing and bad for his liver," but he determined to stop on account of his little boy's health and of his wife being obliged to remain with the child.

The following particulars I received from Sir A. Clark:—"Colonel —— came to me complaining of the dregs of an Indian intermittent, and of successive crops of boils. . . . He had a weak circulation, was dyspeptic, and showed signs of what our fathers would have called the atonic gouty state; beyond depositing lithates, the urine was normal. I found no conclusive evidence of coarse organic disease. He is a delicate man, difficult to treat, and slow in responding to dietetic or drug treatment."

I advised him to submit to a complete saturation with alkalies—bicarbonate of soda and potass, effervescing with citric acid and full doses of quinine and salicine; podophyllin in solution of spirits of wine every night till his skin should be clear, and occasional aperients if needed; and as soon as completely rid of lithæmia, and the liver at work, to take arsenic, continuing the podophyllin and sufficient alkalies to keep the lithæmia in abeyance. With this general plan of treatment well followed up, he completely recovered in all respects, and went, full of life and vigour, on a "political stumping expedition" and enjoyed it. He has kept well up to October, 1884, still residing at Bournemouth.

In this case the accident of life which kept the patient in Bournemouth, against the advice of his friends, afforded a good test experiment of the influence of "the conditions of existence" here in the medical treatment of lithæmia, malarious cachexia, and neuralgia, and the result was most satisfactory; while the case of his little boy (see Chap. V.), although absolutely different in nature, gave the same good results with regard to the "conditions of existence."

Case VI. January, 1884. I was consulted by Mrs. ——, æt. 73, who had come from London for my advice, with considerable fear that the climate would not suit her. She brought the following statement of her case from her London doctor:—

"Mrs. —— has been under my professional care during the past eighteen years or more. She has a good constitution, and her internal organs are all well preserved. The 'attacks' for which I have attended Mrs. —— have always been gastric, abdominal, or both. The 'attack' has come on with severe pains in the abdomen, radiating from the centre of the lower half (probably the ileum), is accompanied by nausea, headache, dry hot skin, increase of temperature of 1·2°, 1·5° above normal. Sometimes the attack is preceded by diarrhœa, at other times there is constipation, the bowels containing numerous hard scybala, which pass with pain, and masses like suet, which I believe to be hardened (fibrinous) mucus. Mrs. —— is very careful in her diet, and is allowed for stimulant one table-spoonful of brandy twice a day." To this the patient added that her sleep was constantly disturbed by sudden starts and palpitations, and much painful rushing of blood to the head, for which she had frequently to take full doses of bromide of potassium; that she was getting very feeble and agitated. My note says:—A fine, intellectual, fattish, flabby old lady, with a fair appetite, and no teeth to masticate with, who has been too much restricted to milk and eggs, instead of having solid food, pancreatine, and teeth. Urine deposits uric acid and urates, but contains no albumen. Bowels do not empty well into the rectum, hence accumulations take place of *débris* of food, and there are fidgetty, incomplete evacuations. Enemata do not reach the accumulations. Goes much into London society, and this, and a large establishment and company at home, are too much for her age, and keep up nervous agitation. The night attacks which have been thought to be apoplectic, are nightmare. I stopped the bromide; ordered as much daily exercise as the strength would bear—some walking, some carriage. Four ounces of olive oil to be injected into the rectum at bed-time, so as to find its way up in the night, (this was soon unnecessary), gr. iii. of compound scammony pill on waking each morning, to secure complete emptying of the bowels, and carefully regulated *solid* meals, with a dose of powdered pancreatine after each meal, to be repeated every hour if any pain set in. Vals water to drink with her brandy, false teeth after returning to town, and to sit up four or five hours after dinner.

She remained at Bournemouth, and under the above plan of treatment, for a month, getting better every day, and keeping quite clear of the "attacks," and on her return, her doctor wrote: "She is so much better, that I shall be glad to send her to Bournemouth whenever I can induce her to go." And she wrote a few weeks afterwards: "My friends think I look very well, and much thinner (a great blessing). I have followed your instructions regularly, and feel much stronger, and have very little discomfort."

Case VII. May, 1884. Mrs. ——, æt. 60, came from North Devon, because "Bournemouth always sets her up if she is weak and ill." My note says, "She is in a pitiable state of cachectic anæmia, nervous agitation and debility, the skin still showing traces of jaundice, and patched with pigment, urine contains a trace of bile, and is loaded with acid, no albumen. Has been seriously ill since March." Her husband wrote: "She complained on March 21st of much thirst and total loss of appetite, on the 24th diarrhœa set in, and was obstinate till the 25th, better on the 28th. She got up, but was so weak and feverish, she had to go back to bed, diarrhœa returned, could not take food. Dr. —— suspected gastric fever. The urine, which had been very dark but not black, now became copious; on the 31st all symptoms were better, and skin acting. April 3rd, got up apparently convalescent; 19th April, obstinate diarrhœa returned, motions quite white, skin jaundiced. These symptoms yielded to hydr. c. cretâ, and pulv. Doveri, followed by podophyllin. There were no rigors."

I gave her Vals water, bark, and podophyllin, plenty of digestible nutritious food, and advised her to drive about in the air as much as her strength would permit. Her improvement was rapid, and quite justified her confidence that "Bournemouth would set her up." She went home well in a few weeks, and had no relapse.

The above cases (which are only specimens of many others of which I have notes) in which there were serious derangements of the digestive functions, cachexia, anæmia, jaundice, liver disease, and other complications, all did remarkably well at Bournemouth. They derived all the good to be expected from marine residence, without any apparent drawbacks. But in each case I took care that they selected residences on high ground, not too near the sea.

Although I have thought it necessary to lay so much stress upon the necessity for guarding against the possible difficulties which residence on the sea coast may produce, I must not be misunderstood. It must not be supposed that I do not fully appreciate "the important remedial properties of sea air," regarding which, I entirely agree with the following remarks of Dr. Herman Weber, our greatest living authority on the subject :—There are patients for whom it is impossible to get too much sea air, and for these a sufficient number of suitable residences can be found at Bournemouth or at Southbourne.

"The sea air and the air at the sea are considerably influenced by the constant evaporation taking place from the sea, and also by the temperature of the sea. Owing to these circumstances, the sea air contains in general more *moisture, relative as well as absolute;* and is more equable in temperature, the summer being less hot, and the winter less cold at the seaside than at inland places in the same latitude ; *the day also may be regarded as less warm in summer, the night as less cool in winter.* A very important fact *is the comparative purity of sea air from organic mixture and inorganic dust,* while the occasional presence of a greater or smaller amount of saline particles cannot be regarded as a disadvantage. . . . . The physiological effects of sea air may be designated with Braun,* as 'powerful stimulation of the change of substance, both retrogressive and formative, expressed in a striking increase of urea and decrease of uric acid and phosphoric acid in the urine; in the greatly increased requirements of food, and in the rapid and considerable increase of the weight of the body.' A certain power of responding to *the increased stimulus of the sea air is, however, required* of the constitution ; for the increased tissue change necessitates an increase in the ingestion of food, and in the processes of excretion of the products of retrogressive tissue change. If the digestive and assimilative organs be unable to satisfy the former demand, various digestive disturbances arise, the appetite fails, and emaciation is often the consequence. . . . .

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* "Curative Effects of Baths and Waters." English edition, 1875, p. 253.

If the excretory functions be imperfect, as is the case in so-called bilious individuals, and in some undefined gouty tendencies, headaches, giddiness, constipation, and other symptoms, usually called 'biliousness,' make their appearance, and sometimes render the removal from the seashore necessary, though the use of aperient remedies, reduction in the amount of food, and especially of stimulants, and active exercise at some distance from the sea, often suffice to correct this defective elimination and its consequences." *

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* Quain's Dictionary, 1882. See also Chapter X., "On Sea Bathing," etc.

CHAPTER IV.

THE PINE WOODS.

Approximate Number of Pines now standing—Long-established Belief in the Medicinal Properties of Pine Woods—Effects of Trees in general upon Air — Soil — Shelter — Temperature — Dew — Hoar-Frost — Important Difference in the Seasons and Effects of the Fall of the Leaf in Deciduous Trees and the Fall of the Needle in Pines—Analysis of the Living and of the Fallen Needles—List of the Species of Pines at Bournemouth, and their Seasons of Flowering, Growth, and Change of Leaf—Pine Stems as Radiators of Heat—Foliage Diathermanous to Sun's Rays, Athermanous to Radiated Heat—Quotations from Independent Authorities in Chemistry, Medicine, and Therapeutics on the Properties of the Products and Emanations from Pine Trees—Turpentine, Tar, Pitch, Terebene, Creosote, Fir-wood Oil, etc.—Internal and External Uses, Inhalations, etc., in different Forms of Disease — Mr. Kingzett's elaborate Scientific Demonstration of the Value of Pine Plantations to Health—Generation of Peroxide of Hydrogen—Camphoric Acid and Camphoraceous Emanations—Their Aseptic, Antiseptic and Disinfecting Influences—The essential Qualifications of Disinfectants for Universal Use—Cymene or Turpene, and Production of Peroxide of Hydrogen in the Presence of Water—Varying Amounts of Turpentine produced by Pines under varying Conditions of Age, Crowding, Isolation, etc.—The Emanations not confined to Full-grown Trees—Discussion of the relative Importance of Aseptic and Antiseptic Atmosphere—High Altitudes and Alpine Winters discussed, and compared with other Means of obtaining the desired Ends—Cases fitted for Alpine Winters, and those for Alpine Summers—Antiseptic and Balsamic Effects of Pine Woods on Disease—Illustrative Cases.

The number of pine trees still left in the different districts of Bournemouth and its immediate surroundings has been carefully estimated for me as follows:—

Branksome Park Estate (Messrs. Rebbeck, managers), 3,388,000 planted, 1,150,000 now standing.

Talbot Woods Estate (Messrs. McWilliam, managers), Talbot Woods, 1,000,000 now standing; plantation on the north side 150,000 still standing (eighty years old).

Durrant Estate (Messrs. Hankinson and Lane, managers). Mr. Hankinson says: "The whole of it was once clothed, but about twenty-eight years ago nearly all the trees were destroyed by fire. Fresh ones are continually being planted by persons who build houses, and large numbers have been planted in the pleasure-grounds; there are also many in the gardens of villas, which have existed for some years. If we add these to such as were left after the fire, the number will be about 9,000 for the district westward of the bridge in the square."

East Cliff and Boscombe Estates of Sir George Meyrick, Sir H. Drummond-Wolff, and Sir Percy F. Shelley, (estimated by Messrs. Rebbeck), about 400,000.

Southbourne-on-Sea, and the adjoining estates of Stourcliff, Stornwood, Carbery, Stourfield, Mr. Hunter's Estate, etc., etc. (estimated by Dr. Compton) about 250,000.

Mr. Clapcott Dean's, Messrs. Kemp Welch's, and a few other Estates—estimates not rendered.

DURING my London practice, when advising patients with pulmonary complaints to visit Bournemouth or Arcachon, I, like most other physicians, always did so with a definite belief that one of the advantages common to these two places was the presence of *pine trees*. Thus, Dr. Walshe says:—

"The balsamic emanations from the pines . . . . give the specific quality to the atmosphere. Now the curative virtues of these emanations is matter of very ancient faith. The old Romans sent patients with ulcerated lungs to Libya, where, by breathing the balsamic effluvia of the pines, with which the country abounded, they are said to have lived many years in safety from their complaints, (Gilchrist, 'Sea Voyages in Medicine,' p. 69.) . . . . Various attempts have been made to explain the sedative influence of the atmosphere of pine-forests. M. Marchel ascribes it to the lowering influence of the terebinthinate vapour constantly floating in the air; others to the disoxygenation of the air by this vapour; others to the action of resinous aromata, etc. These hypotheses are, however, of little consequence; our real point is the climatic influence of the spot on imported phthisis." (p. 645.)*

"It has long been recognised that the atmosphere of pine forests has an invigorating and beneficial effect upon people with weak constitutions and suffering from pulmonary disorders. At some of the watering-places of Germany the very simple prescription of the physician is that the patient should spend several hours a day walking or driving through the pine woods. This simple treatment is sometimes supplemented by the taking of pine baths, and in the case of kidney diseases and for delicate children this is claimed to be highly beneficial. The bath is prepared by simply pouring into the water about half a tumblerful of an extract made from the fresh needles of the pine."†

I was not a little surprised, therefore, after coming to reside at Bournemouth, to find among the residents in the place itself a definite disposition to *discredit the idea of the importance of the pine woods and plantations;* the inquiry, "What do you think of the value of the pines?" being met, in many instances, by a sceptical shrug of the shoulders, and some remark to the effect that too much had been thought of it, and that it was rather a pleasant chimera than anything else. I was the more surprised at this view of the matter because it seemed *primâ facie* to be a depreciatory one with regard to the value of the climate, whereas the persons making these observations, were mostly such as were much interested financially in the prosperity of the place, and not at all disposed *in other matters* to say too little in its praise!

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* "A Practical Treatise on the Diseases of the Lungs, etc., including Notes on Climate," by Walter Hayle Walshe, M.D., etc. 4th Edition, 1871.

† "Midland Medical Miscellany," September, 1884.

After some time, however—and careful investigation of the matter—I discovered the explanation of my difficulty, and I mention it, not only that others may be on their guard against a false impression, but also because I am anxious to put a stop to the self-interested depredations which are associated with this tendency to discredit the professional and popular belief in the value of the pines.

The secret is this. Land has most seriously increased in value in the Bournemouth district, while the demand for houses has correspondingly increased. The natural consequence is that, while building houses on patches of land is a very profitable speculation, the smaller the patch of land given to each house the better for the builders and for the owners of the land; and as houses cannot be built without clearing away trees, the more trees the speculator can get rid of, and the more houses he can build in their place, the better for his profits. But it has evidently struck these financiers that in order to keep up the demand for houses, and the rise in the value of land, which hitherto have depended to a considerable extent upon the belief in the important influence of the pines upon the climate, this belief must be got rid of. Hence, discrediting the value of the pines and getting rid of the pines, have gone hand in hand; and if there really is importance in saving the pines—as I shall easily show that there is—it is necessary to expose the secret of the self-interested but short-sighted attempt to destroy the belief in their value by those who want the ground upon which they stand.

What, then, is the real value of the pines? That is the question.

From an artistic point of view it would be very easy to say a great deal, and as the influence of beauty on the mind, and through the mind upon the nervous system, and hence upon the health, is undoubtedly potent, the artistic is intimately associated with the medical aspect of the case. But, as the artistic view is one so self-evident that no one—who has wandered in Talbot Woods, or Branksome Woods, or Herne Court Woods, or who has seen them standing out against a sunset sky or swaying their branches in the moonlight or mellowed by the gradations of distance—can have failed, in these artistic days, to have appreciated their varied and quiet beauty; I shall not dilate upon it here, but devote what space I have to spare to the more dry and therapeutical consideration of the subject.

First of all, Pines are Trees; and independent of any special virtues as pines, they have certain virtues simply as trees. A correspondence has been recently carried on in the local press at Geneva, as to the value or otherwise of trees in streets and open spaces. Professor Goret, of the University, an eminent physicist and chemist, has replied. He treats the matter from a common-sense and scientific point of view. He says:—

"That trees in streets temper the heat and serve as a protection from dust, and that the evaporation from their leaves tends to keep the surrounding air cool and moist; that the perpetual vibration of their foliage and swaying of their branches, whilst admitting a sufficient amount of light, serve to protect the eyes from the noon-day glare. Professor Goret's last argument is that the roots of trees draw up stagnant waters, and absorb the organic matters contained in the filth from which the streets of a town are never free, and which, after infiltrating the ground, are a frequent cause of fevers and infection. Trees, in fact, have the same effect on the subsoil of towns as fields have on the contents of their sewers—they act as disinfectants. Taking these facts into consideration, the Professor strongly recommends the planting of trees, at proper intervals, in streets and squares. He also condemns the practice that prevails in many continental towns of cutting the trees down to a uniform size, as the branches of trees so treated become so impacted as to be impervious to light, and the shade they give under such circumstances, although deep, is too circumscribed to be of much use."*

"The theory of the movable equilibrium of heat is, that all bodies tend to place themselves in what is called thermic equilibrium with surrounding bodies. Heat is passing in all directions between all objects, say, in a room. If the heat received by any object exceeds that given out by it, its temperature rises; if the contrary is the case, its temperature falls. It is only when the gain and the loss are exactly balanced that the temperature remains constant.

"These considerations enable us to trace the course of events as regards the heat on a sunny day. The amount of heat received from the sun increases hour by hour from his rising until noon, and then decreases again till sunset, while all night long we receive no heat at all from him. The radiating power increases almost *pari passu* with the increasing heat, but *cannot quite keep pace* with it, and so the day grows warmer as it wears on. The heat received begins to decrease when noon is passed, but the amount given off does not equal that received for about two hours, and accordingly the hottest part of the day is about two P.M.; the coldest just before sunrise, because then the influence of solar heat has been withdrawn for the longest possible period, while the earth all the time has been radiating into space."†

Keith Johnston has pointed out that the presence of trees adds to this want of "keeping pace" referred to by Scott, and so delays the approach of the coldness of evening. Thus he says (Op. cit., p. 132) :—"Where forests cover the ground, the change of temperature during the day is much retarded. Observation shows that the trees do not reach their maximum temperature till after sunset, and they thus store up the heat of the day against the cold of night," and in this way assist in graduating the diurnal range of temperature.

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* *Lancet*, January 20th, 1883.

† Scott, Op. cit., p. 47.

Dr. Scoresby Jackson says:—

"Trees give rise to extensive evaporation and radiation, but whilst their removal causes a higher mean temperature, it is followed by *greater extremes of heat and cold.* In some climates trees are essential when they afford protection from the intense heat, and by evaporation provide the necessary amount of moisture to the atmosphere; it is not, therefore, a safe proceeding to sweep away too much wood. A few trees near a dwelling give it a cheerful appearance, and are by no means hurtful; they do not, as has been generally supposed, affect the constitution of the gaseous elements of the atmosphere; but when too densely planted, they render it chill and damp, besides obstructing the salutary currents of air." (Op. cit., p. 11.)

"The protection, or shelter, afforded by trees is of very great value, and is incomparably superior to that of walls, banks, or rocks, because—while it is so effectual as a screen, that a plantation of trees between an ague marsh and the surrounding country will effectually protect those living beyond the trees from malaria—it does not prevent the circulation of air, but, on the contrary, keeps it up; nor does it, like walls and cliffs, produce a back-wind!

"The shelter afforded by trees or shrubs is far more effectual than a solid wall, on account of the back-wind, as it is termed, from the latter, which is often more destructive than the direct wind."* (p. 643.)

A curious phenomenon was observed by Humboldt. He records that in some of the forests of South America, "the traveller, on entering a wood, finds apparently a heavy shower falling, while outside the wood the sky is perfectly clear. Here the formation of dew takes place on the tops of the trees, and so copiously, owing to the abundance of vapour in the tropical atmosphere, that a real shower of rain is the result."†

This extreme result would, of course, not occur in the less

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[*] "Handbook of Hardy Trees," Decaisne, Naudin, and Hemsley.

[†] Scott, Op. cit., p. 118.

moist air of a temperate country, but it strikingly suggests the probability that the tops of trees may act as intercepters of moisture in the atmosphere at night, the radiating power of their leaves condensing it before it reaches the earth, and holding it until evaporated by the rising sun, which would act much more quickly upon it when thus distributed in mid-air, than if it had been deposited upon the ground. That such an effect actually takes place, is, I think, made more probable by the phenomena of hoar frost. Thus, Mr. Scott says:—

"If the dew-point be below the freezing-point, the moisture deposited will pass at once into the solid form, and we shall have the phenomenon of hoar-frost. This is not frozen dew, but water deposited in the solid form. It is, of course, deposited most copiously upon objects which are the *best radiators*, and will, therefore [like dew], be found on grass and herbage. *Trees* are especially prone to exhibit an abundant coating of hoar-frost, forming most lovely objects on a winter's morning." (Op. cit., p. 115.)

Most persons must have observed how frequently it happens that while the trees are thus beautified by hoar-frost, the ground beneath them is quite free from it, showing that the moisture of the air has been intercepted by the tree tops.

But the preceding remarks refer to trees in general, not to pines; and there is one grave objection to trees in general which goes far to outweigh, if it does not in fact more than overbalance, the good influence they have in other respects—I mean "*the fall of the leaf*"—the justly dreaded time for invalids in all places where trees of the ordinary description abound.

The leaves of *deciduous trees* fall at the end of summer, and it must be remembered that they do not fall because they are dead and dried up, but simply in consequence of a vital act on the part of the tree, which shuts off their supply of sap, and closes the vital connection between itself and the leaf, which thus becomes an easy prey to the next gust of wind. Thus the leaves which fall in autumn are more or less full of moisture—according to the rapidity with which they have been removed by the wind after the supply of sap is withdrawn, and to the more or less dampness of the season. The earth beneath is thus covered by a number of sodden sponges, to dry or not according to the dryness or wetness of the particular season; as a general rule, therefore, not to dry till the following year. But this is not all. They fall, as a rule, upon ground already saturated by recent rains, and in proportion to the quantity and largeness of the leaves, intercept the sun's rays from the damp earth beneath, and prevent it from drying by evaporation. "It is evident that the rate of evaporation from bare ground is much more rapid than from earth covered with leaves."*

Thus in a two-fold way do the leaves of deciduous trees promote cold and damp where they fall; and again, when drier and more sunny weather comes, and the sun's rays penetrate through the leafless trees and reach the earth beneath, they fill the lower strata of the air with vapour —vapour none the less unwholesome for the impregnation it necessarily receives with the products of the decomposition which has been going on in the moisture-laden leaves and soil.

All this is changed when the trees are pines.

The leaf of the pine, popularly and very characteristically called the "pine needle," is quite unlike other leaves: while living it is saturated with terebinthinate sap, and, once deprived of its sap it is little more than a shred of woody fibre, and is so deficient in moisture and in absorbent quality for moisture that it is a special favourite with pigeons as a material with which to build their nests. To verify this dryness by experiment, I got Mr. Hardwick, the chemist, to submit average specimens of the pine needles picked from the tree, and others picked up from under the trees, to the same heat in a water-bath; and he found that, while the living needle yielded 56 per cent. of moisture, the fallen needle yielded only 8 per cent. Much drier specimens might have been selected; but I requested him to take an average handful of the needles as they lay in a heap.

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* Scott, Op. cit., p. 99.

But it is not only to the natural structure of the pine leaf that the special dryness of the ground in pine groves is due. There is a most important difference between the season of the "fall of the leaf" in pines and that of other trees. The leaves of trees in general fall "when summer is over, and die when all fair things are fading away;" they therefore miss the drying effect of summer breezes and sunshine, and after becoming sodden with autumn rains, lie as a damp mass throughout the winter. But the leaves or needles of the pines fall during the hotter periods of the year, and soon lose what little moisture they contain under the influence of summer suns; so that before autumn arrives the pine woods have beneath them a deep, dry, and porous floor of needles.

Mr. Enoch White, Fellow of the Royal Horticultural Society, the well-known florist and nurseryman of this district, has furnished me with the following particulars of the species of pines chiefly abounding in the Bournemouth woods and plantations, and of the seasons at which each sheds its leaves or needles:—

1. *Pinus Sylvestris* (Scotch Fir). Flowers in May. Commences to make its growth at the time of flowering, and *sheds its needles after making its growth.* This is the period at which all the pines shed their needles.

2. *Pinus Maritima*, or *Pinaster* (the Clustered Pine). Flowers in June.

3. *Pinus Austriaca*, or *Nigricans* (Black Austrian Pine). Flowers in June.

4. *Pinus Strobus* (the Weymouth Pine, or White Pine of the Americans). Flowers in April.

5. *Pinus Insignis*, or *Californica* (Oregon Pitch Pine). Flowers in April.

All these pines, therefore, shed their leaves or needles before the autumn.

There are many other varieties used for ornamental gardening, but the five enumerated constitute the majority of those which form the woods and groves characteristic of the district. Mr. White says, "The odour arises, generally speaking, when the sun shines strongly on the pines after a heavy shower ; the whole tree yields the odour in consequence of its resinous nature, but the leaves produce the strongest smell ; hence the special effect of the rain and hot sun upon the foliage in producing the very pleasant odour."

It will be seen from the above facts that the fall of the leaves in *pine woods*, instead of having the injurious effects so well known to belong to the fall of the leaf of deciduous trees, is positively advantageous to health.

There is another circumstance with regard to pine woods, which partly accounts for their healthfulness in contrast with woods of deciduous trees. I have already referred to the fact that "the air is warmed, not by the direct passage of the sun's rays through it, since but little heat is absorbed in this way by the atmosphere, but chiefly by contact with the warmed surface of the earth ; hence it is evident that the lowest strata of the air in immediate contact with the earth, will be most heated by the sun's rays, and the upper the least."*

And "as soon as the heat from the sun has reached the earth, its warming effect on the air begins to be available, for it has changed its character and become 'dark heat,' that is, heat coming from a source of comparatively low temperature. Such heat is absorbed by the atmosphere with much greater facility than heat coming from the sun."†

Now one of the most striking beauties, in an artistic sense, peculiar to pine woods, is the brilliant illumination of the stems on the side towards the sun, which from his rising to his setting, bursts forth with every ray of sunshine, filling the woods with tints of every variety of burnt sienna, brown madder, purple lake, yellow ochre, and Turner's brown.

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* Keith Johnston, Op. cit., p. 130.

† Scott, Op. cit., p. 53.

This is due to the peculiar character of the pine foliage, which, partly from the needle-like form of the leaves, and partly from the small amount of foliage in proportion to the stems, allows the rays of the sun to pierce the foliaged tops of the trees, and fall upon the long glowing stems.

The consequence of this upon the climate and temperature of the pine woods is very marked. Every tree-stem on which the heat rays impinge, becomes, like the earth beneath it, a radiator of "dark heat" into the atmosphere around, thus multiplying indefinitely the extent of the heat-giving surface.

This effect of the special characters of pines is self-evident. It is probable, but not so easily demonstrable, that while the foliage of a pine forest is diathermanous to the sun's direct rays, it may be, to some extent at least, athermanous to the "dark heat" radiating from the stems and earth, and thus may act, in a modified degree of course, in the same manner as the old device of a black box with a glass lid for accumulating heat.

"The use of a box, blackened inside and out, and provided with a glazed lid, to increase the effect of the sun's heat on an inclosed thermometer, is a very old device. The reason of its efficacy is that while the glass is *diathermanous* to the rays of heat coming from the sun, it is nearly *athermanous* to rays coming from a cooler body, such as the contained thermometer, and it therefore does not allow the heat which enters the box to escape with the same facility as it passed in.

"A familiar illustration of this property of glass is afforded by the use of glass fire-screens, which allow a view of the fire while stopping the heat; whereas, as everyone knows, the glass of a window stops comparatively little of the sun's heat. The reason is that the temperature of the fire is infinitely lower than that of the sun's surface, and accordingly the so-called 'dark' heat rays from the fire cannot pass through the glass, while those emanating from the sun are freely transmitted.

"In such a box as has been described the temperature has been known to rise above the boiling point of water."*

But all that I have yet said of the beneficial influences of pine woods is of small importance compared to the main question, to which these remarks have been only preliminary, I mean the question of the value of the *emanations from the pines,* which we will now carefully consider.

Fortunately the subject has been recently most elaborately worked out by Mr. Kingzett in the experiments and investigations by which he was led to the discovery of "Sanitas." And as his labours were perfectly independent of any interest in lauding this or that health resort, or, indeed, of any reason for extolling a residence in pine plantations, they have for us an increased value.

But before making use of Mr. Kingzett's results, it will be advisable to see what evidence preceded them to show that the longstanding belief in the health-giving and health-restoring influence of pine woods was well founded.

I shall therefore now give a selection of quotations from standard and independent authorities in Chemistry, Medicine, and Therapeutics specially referring to this part of the subject.

"*Pinus sylvestris* (Scotch Fir). This pine, as well as *P. maritima* (Pinaster) and other species of pinus, affords common turpentine and its oil, resin, tar, and pitch.

"1. Common turpentine of Europe is obtained by wounding the tree in hot weather. It is used chiefly as a dressing for wounds, etc., in horses, and for the distillation of the oil. . . .

"2. When the cold begins to check the exudation of the common turpentine, part of it concretes in the wounds (of the the trees). This is called in France Gallipot Barras, and white rosin (*resina alba*) when hardened by long exposure to the air.

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* Scott, Op. cit., p. 53.

"3. When the old trees are subjected to distillation in a coarse manner, tar is obtained (*Pix liquida*, Goudron)."

"Tar water, infusion of tar, Eau de Goudron. . . . . It was at one time a fashionable remedy in numerous complaints, and its use has been revived since its virtues have been presumed to be owing to creosote. It is employed chiefly in pulmonary affections, and the vapour has been recommended in phthisis and other diseases of the lungs. A wine or beer of tar, tar beer, Jews' beer, has been employed in Philadelphia in similar cases. . . . .

"Common pitch is obtained by inspissating tar." (Dunglison.)*

Terebinthina.—"The different species of pine and fir form resin-ducts in the bark or wood in which liquid oleo-resins secrete. In some species the oleo-resin exudes to some extent spontaneously, but the various turpentines of commerce are obtained by wounding the trees.

"The 'Proceedings of the American Pharmaceutical Association, 1877,' record that in one year 5,000 gallons of pure turpentine were collected from the trees in the Laurentine Mountains, Quebec, by the 'balsam-gatherers,' who, with their whole families, encamp in the woods for two or three months each year.

"The young shoots of *Pinus sylvestris* are officinal in some Pharmacopœias; they are collected when about two inches long, are glutinous from an oleo-resinous exudation, and have an agreeable terebinthinate odour, and a bitter, resinous, and rather acrid taste.

"The leaves of the different species of pine, when distilled with water, yield volatile oils, *which differ from the volatile oils obtained from the resin of the same species* . . . .

"Oil of turpentine is obtained by distilling the oleo-resinous exudations of the various species of pinus . . . .

"Numerous experiments upon animals prove that oil of turpentine, *however applied, is rapidly absorbed*, and produces, according to the quantity employed, more or less of its characteristic effects.

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* "A Dictionary of Medical Science, etc." By Robley Dunglison, M.D., LL.D., etc. New ed. 1876.

"It has been used with success in almost every form of hæmorrhage; but most successfully when the bleeding was passive. The special affections include epistaxis, hæmatemesis, hæmaturia, menorrhagia, post-partum hæmorrhage, purpura, and the multiple hæmorrhages occurring under the influence of the hæmorrhagic diathesis. Even in external and traumatic hæmorrhages, it has proved efficient. Its efficacy justifies the opinion of John Hunter, who termed it 'the best, if not the only true styptic.'

"In puerperal fever. . . . When it was employed in cases marked by a typhoid state, in which excessive tympanitis existed, there is no reasonable ground for doubting that it often successfully combated the nervous and cardiac depression of the disease, and by lessening the distension of the abdomen, diminished the mechanical hindrances to hæmatosis. . . . This judgment appears to be justified by its recognised effects in other febrile affections of a typhoid type. . . . In *typhus*, for example, it is of great utility, both internally and externally, not only for its power of arousing the sluggish functions generally, but especially for combating the pulmonary congestion which is the gravest of the usual incidents of the disease.

". . . . Although the *modus operandi* of this medicine in *sciatica* is totally unknown, its curative power is none the less certain. It has stood the test of a century's experience. Probably no other remedy is comparable with it in chronic examples of this painful and crippling affection. . . .

"In all forms of chronic bronchitis, oil of turpentine has, like other terebinthinates, been largely used, formerly by internal administration, and more recently by inhalation. It is especially useful, in both ways, in cases of *fetid bronchitis*, and *gangrene of the lung*. The superiority of oil of turpentine in the latter affection, consists in its great stimulant virtues.

An atomised solution of fifteen drops of oil of turpentine in sufficient water to half fill the boiler of Tiemann's steam atomiser, is recommended to be inhaled every hour for about ten minutes, day and night, in the treatment of *diphtheria* (Edel). The vapours of this oil are also reported to be efficient in *whooping cough.* The accidental discovery of the power of oil of turpentine to prevent *phosphorous poisoning* has saved many lives. . . .

"There are few *ulcers* of an indolent character that are not benefited by this oil."

"*Terebene* has been employed with striking success as a substitute for carbolic acid in the antiseptic dressing of wounds, ulcers, burns, etc. It thoroughly deodorises the secretions, and protects the surface to which it is applied from the contact of air. It is supposed, like carbolic acid, to destroy morbid germs, since it deprives vaccine virus of its activity.

"Creosote, which was discovered by Reichenbach (1830), is one of the numerous products resulting from the dry distillation of wood. . . . Both by inhalation, and by internal administration, it tends to reduce excessive bronchial secretion. . . .

"When a solution of two or three drops of creosote in a fluid drachm of alcohol is diluted with six fluid drachms of water, it forms one of the best atomised remedies for the symptoms in question." (Stillé and Maisch.) *

Dr. Napheys gives 22 formulæ containing turpentine, as prescribed by leading practitioners in different parts of the world in a variety of diseases, but principally in those affecting the mucous tracts.†

Dr. Charles Phillips, says of turpentine :—

"Turpentine has been applied to a large number of remedial purposes, and its value, though often exaggerated, is very great.

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* "The National Dispensatory." By Alfred Stillé, M.D., LL.D., and John M. Maisch, Phar. D., 2nd Ed., 1879.

† "Modern Medical Therapeutics." By G. H. Napheys, A.M., M.D. 3rd Ed. Philadelphia, 1871.

"*As a stimulant narcotic in neuralgia,* turpentine sometimes proves of wonderful service. . . . Sciatica is pre-eminently the neuralgia in which success may be expected from the use of turpentine. . . . When it does succeed, the cure is often astonishingly rapid and complete. Of late years turpentine has been naturally a good deal pushed out of view as an anti-neuralgic medicine by the many new and powerful remedies for pain which have been introduced; but its powers in this respect should not be forgotten, as they sometimes prove highly serviceable.

"*In chronic rheumatism,* threatening to become inveterate, and having already produced considerable deformities in the joints, turpentine is one of the few remedies which will occasionally arrest the downward progress of the case, and frequently give relief to pain.

"*In cases of excessive and unhealthy discharges from mucous membranes,* turpentine is a remedy that frequently acts with great effect. In bronchorrhœa, especially when the discharge becomes fœtid, and more particularly in gangrene of the lung, turpentine has been used with the best effect, both in small doses by the stomach, and by inhalation from hot water. It has been employed with occasional success in chronic blenorrhœa, and in chronic cystitis, with ropy secretion.

"*For hæmorrhage* of various kinds there can be no doubt that turpentine often proves very efficacious. Inhaled from hot water, or taken in repeated half-drachm doses by the stomach, it has not unfrequently checked serious hæmoptysis. But its most undoubtedly beneficial action in this way is shown in typhoid fever; here it often proves invaluable in cases where there is a disposition at once to hæmorrhage and to extreme tympanitis. It is then best given by enema, 30 or 60 ♏ in starch-mucilage, either alone or (if there be much discharge and pain) with 10 ♏ of liq. opii.

"*Tympanitic conditions* of the large intestines, occurring under many other circumstances besides typhoid fever, are often greatly benefited by turpentine.

"*In cases of ulceration of the bowels,* when the tongue parts with its fur in large flakes, and when the surface appears smooth and varnished, turpentine is strongly to be recommended. It not only moistens the tongue and covers it with a healthy fur, but all the other ulcerative symptoms quickly abate.

"*In pure atonic constipation,* with gaseous distension of the large bowel, the persistent use of this medicine has not unfrequently triumphed when all other remedies have failed. In the meteorismus which occurs in a certain class of cases often reckoned among the puerperal fevers, the stimulant influence of turpentine again often leads to the happiest results; and it may be suspected that the warm praises bestowed upon turpentine by Ramsbotham, Marshall Hall, and others, as a remedy in puerperal fever, really referred to cases of this sort, and not to instances of the general puerperal utero-peritonitis. . . .

"*As a simple purgative* for any one particular occasion, turpentine is best given in enema. Half an ounce with an equal quantity of castor oil and half a pint to a pint of gruel usually acts very promptly and conveniently.

"*As a vermifuge* turpentine once enjoyed much approval, but may now be said to be superseded. Its chief efficacy is in the treatment of tapeworm; but it is so decidedly inferior to Felix-mas and Kousso for this purpose as to be scarcely worth consideration.

"*In iritis* of the so-called 'rheumatic' variety, turpentine has been very successfully used by Carmichael and others in small repeated doses.

"*Dropsy* with albuminous urine depending upon non-desquamative disease of the kidney, yields in a remarkable way to drop or even to half-drop doses of turpentine every 2 to 4 hours.

"*Poisoning by Phosphorus.*—Oil of turpentine given in 30 ♏ doses in mucilage, every quarter-of-an-hour or thereabouts, is an excellent antidote for the poisonous effects of phosphorus.

"*External Uses.*—As an external remedy oil of turpentine has numerous modes of application; the principle of its employment being in every instance that of counter-irritation. As a liniment, either cold or hot, it is valuable in chronic rheumatism, sprains, sore throat, and various neuralgic affections; also as a fomentation in puerperal peritonitis, pleuro-pneumonia, and all inflammations of serous membranes. Severe and dangerous burns and scalds, especially when the local injury is accompanied by great constitutional depression, are likewise treated with it very successfully; and occasionally it is found useful in those dry and chronic forms of gangrene which are not preceded by inflammation. . . .

"*Tar* is the bituminous liquid obtained by distillation from the wood and roots of the Pinus sylvestris, the familiar tree known under the name of 'Scotch fir.' . . . . The effects when it is employed medicinally are analogous to those of turpentine, but are modified by the presence of acetic acid and the pyrogenous products."

"*Physiological action.* . . . . When large doses have been taken the pulse appears to be depressed, but not increased in frequency, while *tar water* in small doses is said to quicken the pulse, and to act both as a diuretic and a sudorific. When the *vapour of tar* is inhaled, it *increases* the secretion from the bronchial mucous membrane. . . .

"*Therapeutic action.*—Tar may be used internally in chronic catarrhal affections, especially in chronic bronchitis. It diminishes the secretion and allays the cough. It is also valuable in tuberculous phthisis, acting as an expectorant, soothing the cough and relieving oppression; at the same time it helps the digestive system, increasing the appetite; and if colliquative diarrhœa is troublesome it tends to remove it. On the other hand tar frequently overcomes constipation. It is very valuable in complaints of the urinary passages, such as vesical catarrh; this affection is greatly improved by daily injections of tar water into the bladder. Its use in certain chronic affections of the skin has long been known . . . . In unhealthy ulcers, tar-water has been extensively and successfully resorted to. As a disinfectant and deodorizer it has been most beneficially employed. Inhaled, as before stated, the vapour is useful in alleviating chronic bronchitis and other pulmonary affections; in acute inflammations and hectic fever, its use should be avoided. In pulmonary affections the steam of tar water from a vaporiser is the most useful mode of inhalation. It not only increases the bronchial secretion where the mucous membrane is dry and inactive, but in other cases diminishes it where the secretion is already too profuse."

"*Burgundy Pitch.*—This valuable product is yielded by the Norway spruce, *Abies excelsa,* a tree found wherever conifers are cultivated, and as well known as the Scotch fir. . . . The pitch itself is the resinous exudation of the trunk, melted and strained; the best comes from Switzerland.

"*Physiological Action.*—The local action of Burgundy pitch is that of a mild irritant. Certain constitutions are affected by it in a very remarkable manner, a troublesome inflammation of a vesicular and pustular character ensuing upon its extensive employment.

"*Therapeutic Action.*—Burgundy pitch-plaster is usefully applied to the chest in chronic pulmonary affections, also to the loins in cases of lumbago, to the joints in chronic articular affections, or to any external part of the body where there is local pain of a rheumatic character, and also where (as in chronic pleurisy) it is desirable to afford firm mechanical support and pressure." (pp. 195 to 201.)*

Turpentine.—"A very valuable way of using turpentine (or oleum pini sylvestris, which has a pleasant odour) in chronic bronchitis is to evaporate two or three tablespoonfuls in the patient's sleeping-room during the night. This is easily and safely done by putting it into the upper portion of Clark's pyramid food warmer, taking care to put water in the lower receptacle." (p. 204.)*

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* "Materia Medica and Therapeutics.—Vegetable Kingdom." By C. D. F. Phillips, M.D., F.R.C.S.E. 1874.

Oil of Turpentine in Hæmoptysis.—"For my own part I much prefer turpentine to lead, over which it has very important advantages to set against its one disadvantage, viz., its nasty taste. I have often seen it succeed when lead has failed, and I never prescribe lead till I have tried turpentine unless the patient refuses to take the latter, or unless—and this is an important proviso—there is great vascular excitement, in which case lead is eminently suitable, and turpentine quite the contrary.

"Turpentine is a thoroughly wholesome medicine in every sense. It is restorative, antiseptic, anti-inflammatory, anti-catarrhal; the system may be rapidly impregnated with it—as seen by its appearance in the breath and in the urine—either by administering it by the mouth or by using it for injection, inhalation, or liniment. It has also the advantage of acting as a counter-irritant when applied to the chest walls at the same time that its fumes are being inhaled. . . . It may be taken in orange or lemon juice, a piece of orange or lemon peel being masticated directly after it, and this I consider by far the best way.

"The *modus operandi* of turpentine in stopping hæmorrhage has never been satisfactorily explained. Headland classes it (with a mark of interrogation) among vegetable astringents, and adds: 'These volatile oils (turpentine, cubebs, copaiba) are perfectly incapable of exciting a true astringent action. But it should be observed that turpentine when in large proportions coagulates albumen, and on the supposition that it really is an astringent, turpentine has been often prescribed as a remedy for hæmorrhages in different parts of the body.'

"Dr. Ringer does not attempt any explanation of the mode in which it acts, but he says ("Handbook of Therapeutics,"

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* "On Winter Cough, Catarrh, Bronchitis, Emphysema, Asthma." By Horace Dobell, M.D. 3rd Edition. 1875.

6th ed.): 'Turpentine passes readily into the blood, and may be detected in the *breath* and sweat, and in an altered state in the urine, giving to the excretions an odour of violets or of mignonette. . . . It is very efficacious in bleeding from the various organs of the body, as the lungs, nose, uterus, kidneys, and bladder. . . . It is also reputed to possess the power of checking bleeding in the *hæmorrhagic diathesis*, and to be useful in purpura.'

"Through an accident, I once had a good opportunity of observing the wonderfully energetic action of which turpentine is capable in stopping internal hæmorrhage when given in large doses. A tall, fat, licensed victualler was suffering from purpura; his skin was covered with purpuric blotches, and he was bleeding freely from the lungs, kidneys, and bowels. I prescribed a *teaspoonful* of spirit of turpentine in a glass of gin every three hours, and by some blunder of the nurse—probably explained by her being in a public-house with command of gin—*a tablespoonful* of turpentine was given for each dose, instead of a teaspoonful; and when I saw the patient the following day, he had taken four doses with the happiest effect! The bowels had been violently purged of a quantity of clotted blood; his urine, breath, and perspiration were redolent of violets and mignonette; bleeding had ceased at every point, and from that day forth he got rapidly well without any other remedy." (pp. 128, 129.)*

"*Tar and Ipecacuanha Spray in Winter Cough.*—Dr. Sydney Ringer and Dr. Wm. Murrell report some observations on the value of tar in bronchial catarrh and winter cough. The drug was given in 2 grain doses, made into a pill, repeated every 3 or 4 hours. It was tried in twenty-five cases. Most of the patients began to improve from the fourth to the seventh day, and in about three weeks were well enough to discontinue treatment. A relapse often occurred in a week or two, but the symptoms a second time quickly subsided under similar treatment. Tar was found to be useless in bronchial asthma, and its effects were more evident in cases where expectoration and cough were more marked than dyspnœa. . . .

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* Dr. Dobell "On Loss of Weight," etc., Op. cit. 2nd ed.

" *Tar in Chronic Affections of the Mucous Membranes.*—Dr. M'Call Anderson testifies (" British Medical Journal," April 24th, 1875) to the virtues of tar as an internal remedy in catarrh of the bronchial tubes, and in chronic affections of the mucous membranes generally."*

" Rossbach finds that in animals the topical application of air passed through turpentine lessens the tracheal secretion; but a watery solution of turpentine, whilst constricting the vessels, increases the normal secretion." (p. 405.) †

" *Creosote*—Is obtained from tar by distillation, and appears to be the active, antiseptic, and medicinal agent in tar water and crude pyroligneous acid. . . . It coagulates albumen, whence its hæmostatic power. It is a most powerful antiseptic, and has been largely administered in hæmorrhages, both internally and externally. As an external application it has been used in burns, ulcers (especially those of a sloughing character), and chronic cutaneous affections, and has been applied to tapeworm when protruded. Internally it has been administered in phthisis, vomiting, diabetes mellitus, nervous diseases, chronic glanders, etc."‡

" *Tar* has been employed in medicine from the earliest times. . . . It is prepared by submitting the roots and branches of the different pine trees to a smothered combustion.

" It is a very complex resin and oil of turpentine, both modified (forming pyretine and pyroleine), some charcoal and pyroligneous acid, with various products of the destructive distillation of wood. . . .

" Tar taken internally is an alterative stimulant. . . . Applied externally it promotes a healthy action in indolent ulcers. . . . The vapour is sometimes inhaled in chronic bronchial affections.

* Dr. Dobell's " Reports on Diseases of the Chest," Vol. I., 1875.

† " A Handbook of Therapeutics." By Sydney Ringer, M.D. 10th ed. 1883.

‡ Dunglison's Dictionary, Op. cit.

"*Tar Water*, holding creosote and other matters in solution, was considered by Bishop Berkeley to be a panacea for most diseases."*

It would be difficult to bring together so large a body of evidence, from recognised authorities, as to the properties and potency of any other therapeutic agents, as is presented by the foregoing quotations in reference to the value of the various products which emanate from pines. Yet this selection is small compared to the mass of quotations I might have made of a similar nature had space permitted, and I have yet reserved the recent observations of Mr. Kingzett, to which I referred at p. 78, and which bring the matter into scientific focus and practical proof.

In these latter days the diffusion of scientific knowledge has been so wide and rapid that it has necessarily suffered a proportionate dilution, and the dangerous "*littleness*" of the amount and quality of the knowledge possessed by the majority of individuals has unavoidably led to a petty scepticism. It may be hoped that this is but a transient phase, which will in time give place to the greater wisdom of more perfect knowledge, accompanied by a well tempered belief in the traditions of experience.

But in its present phase—when the rising generation will hardly believe in its own paternity without some pseudo-scientific demonstration of the powers of a germ—it is not to be wondered at that such ambiguous terms as "balsamic influence," "health-giving emanations," "aromatised atmosphere," etc., etc.—although backed by the history of centuries of careful observation, and actually expressing the concrete results of experience—should be laughed at as empty words employed to disguise chimerical ideas. It appears to have been under such influences that many ancient faiths, and amongst them the belief in the hygienic value of pine woods, have come to be discredited, and invaluable

* Royle's "Manual of Materia Medica."

possessions have been contemptuously cast to the winds, or sacrificed to the axe.

It is most fortunate and satisfactory that, in the case under consideration, we are now able to meet the growing scepticism and to satisfy the craving for material evidence, not by any pseudo-scientific jargon, but by the weight of an elaborate scientific examination and the demonstration of palpable facts. Those who have the time and sufficient technical knowledge will, I hope, be induced to read *in extenso* Mr. Kingzett's most interesting and valuable book;* but for our present purpose it will be sufficient to consider the following passages, which I have carefully selected from different parts of his work, as directly proving the value of pine plantations in relation to health.

"Of the many scientific subjects which, during recent years, have strongly arrested the attention of the public, few have excited more interest than that which has been manifested from time to time regarding the reputed sanitary properties of the eucalyptus tree. But while this interest extended even to several European and other Governments, and although the hygienic value of the eucalyptus is based upon an abundant and increasing amount of evidence, yet no satisfactory explanation of this influence has ever been presented to the public.

"During some years I have spent much time in the study of what are known to chemists as processes of slow oxidation, and have communicated the results of my researches to various scientific societies. These investigations, conducted, so to say, in the laboratory of nature, furnished a full and sufficient explanation of the sanitary properties of the eucalyptus tree, *and they also proved that the* PINE TREE exhibits characters of the same important order. (p. vi.)

"One fact must be stated in particular here, because when we get further on we shall find it of considerable importance. It is this: Whereas, when ozone is exposed to contact with many chemical substances, it suffers decomposition, yielding up its third atom of oxygen to the oxidisable matter, and liberating ordinary oxygen, yet when submitted to contact with ordinary turpentine, the whole molecule of the ozone is absorbed; no oxygen remains behind. For a knowledge of this fact we are indebted to Soret. (p. 7.)

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* "Nature's Hygiene. A Series of Essays, with special reference to the Chemistry and Hygiene of the Eucalyptus and the Pine." By C. T. Kingzett, F.C.S. London and Berlin. 1880.

"The atmospheric oxidation of turpentine and other similar substances has been a special study with the author for many years, but this is a subject which from its nature and extent demands exhaustive treatment in a subsequent chapter. (p. 14.)

"On inquiry it is found that plant life furnishes back to the atmosphere the oxygen which animal life takes away from it. It is a fact that the growth and development of vegetation depends upon its elimination of oxygen from the very carbonic anhydride which animal life pours into the atmosphere. . . . In this way the composition of the atmosphere, which is a mixture of 21 parts of oxygen with 79 parts of nitrogen is kept practically constant and universal. (p. 19.)

"Oxygen cannot be breathed with impunity for any length of time; and indeed, when inhaled in the pure state, it exercises a severe poisonous effect. M. Paul Bert, who has devoted much time to the study of this subject, found that oxygen acts as a rapid poison when arterial blood contains 35 per cent., or nearly double the normal amount; the convulsions and death which result from it being due to a great exaggeration of the excito-motor power of the spinal cord. Compressed air exerts a similar influence. . . . From these facts we see the reason why, as found in nature, the oxygen of the atmosphere is diluted to so large an extent with nitrogen, which is innocuous to health. By this dilution the oxygen is rendered powerless to produce the evil results which follow when the pure gas is breathed, while its power to oxidize the matters presented to it in the blood is not in any way impaired." (p. 21.)

"Beyond its power to maintain life and support combustion, oxygen gas exhibits but few chemical reactions which are not also shared by ozone and *peroxide of hydrogen.* It differs from these two last-named substances, however, in being less active in its properties." (p. 22.)

" The chemical reagents and tests which have been applied by different observers in determining the presence and amount of ozone in the atmosphere under various circumstances are not alone influenced by ozone; *they are also influenced by peroxide of hydrogen,* and there is at present no reliable and practicable method of testing and estimating the one substance without the other. . . .

" The reader, then, may rest content in the assurance that even if ozone does not occur in the air so freely as he previously believed, yet another substance does, and one, too *of equal sanitary value, viz., peroxide of hydrogen.* . . . It must yet be distinctly understood that there is no known test for ozone admitting of application which is not also affected by peroxide of hydrogen." (p. 25.)

" This substance (peroxide of hydrogen) is a very remarkable one, and differs essentially from oxygen and ozone in being a liquid at the ordinary atmospheric temperature and pressure." (p. 33.)

" The occurrence of peroxide of hydrogen in nature until quite recently attracted very little attention, and this is not surprising if it be considered that there were but slight means of distinguishing between it and ozone. Moreover many of the natural processes now well known to generate peroxide of hydrogen were, up to the last few years, regarded exclusively as sources of ozone. In fact, the peroxide of hydrogen, giving the same tests, was mistaken for ozone. . . .

" Since that time much attention has been given to this subject by various observers, and particularly so since the author of this treatise discovered that *all kinds of aromatic plants produce peroxide of hydrogen liberally.* The way in which they do this is reserved for special treatment in a separate chapter, and here the mere statement may be permitted that probably every plant and flower of perfume (including all those which are known to secrete essential oils) generates peroxide of hydrogen into the atmosphere, by the joint or successive action of air and water upon the said oils and perfumes." (p. 35.)

"Two volumes or atoms of hydrogen, when exploded with one atom or volume of oxygen combine and form one molecule (two volumes) of water: $H_2+O=H_2O$. Now peroxide of hydrogen contains one more atom or volume of oxygen than does water in its molecule, and so it is represented by the formula H_2O_2." (p. 40.)

"All animal and vegetable substances in a state of change or decomposition are rapidly acted upon by peroxide of hydrogen, much more vigorously, indeed, than by ordinary air, or indeed by pure oxygen; and hereafter we shall see what an important part it plays as a natural disinfectant. Curiously enough, it not only exercises a disinfecting action by virtue of its powers to give up oxygen to decomposing matters, but it can absolutely arrest decomposition, under conditions to be named hereafter." (p. 48.)

"Now, whatever oxygen, as air, is capable of doing in nature in the shape of harmless oxidation, ozone and peroxide of hydrogen are much better qualified to do." (p. 56.).

"Peroxide of hydrogen also contains oxygen in a most powerful and active form; it can no sooner come into contact with oxidizable matters than it at once gives up its oxygen to them, in not only a pure but also a nascent state; and be it remarked that this is, universally, the most active state of gases. Moreover, by its liquid form (its wetness, so to speak) it is particularly qualified to come readily into intimate contact with substances. It has also been shown that peroxide of hydrogen is either fatal to certain kinds of germ life (vibriones) or else arrests their influence, so that putrefaction cannot occur in animal or vegetable substances protected by it. . . . . Septic organisms certainly cannot exist in the presence of peroxide of hydrogen." (p. 57.)

"If turpentine be heated in contact with a stream of air, it suffers a change of a definite kind, but it is one which is gradual, and amongst other products peroxide of hydrogen is produced." (p. 58.)

"It must be remembered that slow oxidation or eremacausis is a process which must be deemed to occur in nature apart from putrefaction, at least in most cases. The two processes are in essence quite distinct, and depend upon entirely different germs. At times, undoubtedly, putrefaction either precedes or progresses simultaneously with slow combustion. Sanitary science aims at preventing this. It cannot materially interfere with Nature's grand law of slow combustion; but it can and does aim at preventing putrefaction." (p. 64.)

"It has thus been shown that there are :—

"1. Diseases which are due to parasites.

"2. Contagious diseases which depend perhaps upon graft-germs, or degraded forms of bioplasm.

"3. Diseases which are due to mere chemical products, as is probably the case with the poisoning produced by sepsin.

"Finally, it is seen that all these diseases originate from matters of an animal or vegetable origin, which may be directly derived from organisms by certain processes of change induced by degraded bioplasm or by microphytes (as putrefaction)."

"And now, having reviewed the various theories of disease and the facts upon which they are based, to what conclusion are we impelled as regards the practical prevention of epidemics? The only conclusion points to the necessity of observing cleanliness of the body as of paramount importance with the health of the mind, and of securing pure air and water, as also absolutely essential to sanitation." (p. 89.)

"We are left in no kind of doubt that at least many infectious diseases have their origin in putrefactive processes, and it may even be that sepsin is one sort of infectant. In any case every medical practitioner and sanitarian is assured of the help which filth and unsanitary processes give to contagious fevers. All maintain the vital importance of cleanliness, absence of putrefactive changes, and a good supply of fresh air and water. (p. 97.)

"Hence, in sanitary science, we aim at preventing putrefaction under given conditions, and the agents employed to prevent such processes are termed *antiseptics.*

"Indeed an *antiseptic* may be defined as a substance which, when properly applied, prevents the formation of septic poisons in its vicinity. Such substances are not rarely termed *disinfectants.* . . .

"It may, indeed, be taken for granted that the whole experience of the world in all ages goes to show that much contagious disease originates in the putrefaction of animal and vegetable matter going on in the midst of human habitations, and that the attempt to identify parasites with the causes of such diseases, is based, to a large extent, upon pure hypothesis. (p. 98.)

"It has certainly been observed that the germ-life which loads the atmosphere is instrumental in initiating and assisting putrefactive changes; but it is not germ life which is in itself dangerous to the health of mankind; on the contrary, it would seem to be quite innocuous, the danger arising from the poisonous products to which putrefactive change gives rise." (p. 99.)

"From all this we perceive the importance of using antiseptic agents, capable of either entirely preventing such a process from occurring in our midst, or of so influencing matters that the poisons which would result under normal conditions are no longer formed. Such effects as these can be witnessed in the laboratory. . . .

"With these facts before us it is possible to indicate the existence of at least three classes of substances, all of which are termed disinfectants. (p. 99.)

"First of all there are the substances, like carbolic acid and thymol, which being parasiticides, have the power, when present in sufficient quantity, of killing the living things (germs) which initiate putrefactive change.

" Secondly, there are other substances, like turpentine and camphor, which while they exhibit a far less power of life destruction, are yet capable of preventing putrefaction, possibly by diverting germ life from its normal actions in virtue of peculiar chemical and physiological effects.

" Thirdly, there are substances which, if applied to putrefied matters, are capable of oxidizing the effete matters and thus destroying the poisonous principle.

" The permanganates of sodium and potassium and peroxide of hydrogen are illustrative of this latter class of substances. Thus Mr. H. B. Condy says ('Chemical News,' vol. xxiii.): 'The disinfecting effects of alkaline permanganates are due not to antiseptic virtues, but to their oxidizing powers . . . . in this respect they resemble pure air. . . . This is the one by which ventilation acts as disinfectant.' He further writes: 'Carbolic acid is a deoxidating agent which when added to pure air, vitiates it, inasmuch as it behaves exactly like animal respiration, robbing the atmosphere of oxygen.'

" Dr. Angus Smith ('Air and Rain,' p. 3) says tersely enough, 'We live in air, and the air flows continually into our blood; no wonder, then, that we are influenced by climate, which means the constitution of the air!' Such a condition cannot be improved by the presence of poisonous and unwholesome substances like carbolic and sulphurous acids. (pp. 100, 101.)

" For universal use it is essential that a disinfectant should be perfectly non-poisonous, non-inflammable, non-destructive to linen and furniture, and yield no stain; it is also desirable that it should be capable of deodorising, in which process it should not act by merely substituting one evil smell for the other; if, with all these properties it should be healthful in itself and useful for other purposes, such as preserving articles of food, etc., the agent in question approaches perfection. . . . (p. 102.) [To this I should add a gaseous or vaporous or volatile condition, so that it may be respired with air.] (See p. 103.)

"It is easily understood, then, having regard to those attractions which bind atom to atom in a compound, that many substances may behave as antiseptics, and in very different ways. One antiseptic may act by entering into a sort of combination with the substance to be preserved, and thus strengthen it against all decomposing influences. Another may by its mere presence render the substance unfit pabulum for bacterial life; or again it may serve as food to the germ life, and thus save the other material which would otherwise succumb to putrefactive change. In brief, every substance which tends to increase the resistance to change in matters susceptible of putrefaction *is an antiseptic and a disinfectant, no matter how it acts*. . . .

"In a subsequent chapter the essential qualifications of disinfectants intended for universal use will be reproduced, with a view of testing how far *one of these—which is produced in nature*—fulfils its purpose." (p. 105.)

"It has been known for ages that the atmosphere of pine forests is most favourable to invalids suffering from pulmonary affections; and even at the present time it is customary to send invalids to breathe the exhalations of the coniferæ. Such exhalations are generally, although *quite erroneously, supposed to be strongly ozonised in character*." (p. 231.)

"We have then again the case of camphor, which from time immemorial has enjoyed a reputation as an antiseptic." (p. 124.)

"Reviewing now the facts recited in the foregoing pages, we are presented with a mass of indisputable evidence, showing firstly, that the eucalyptus tree both prevents and removes malarial fever; secondly, that the oil of eucalyptus also exhibits peculiar vermifugal, antiseptic, and disinfecting properties; thirdly, that pine forests exercise an important hygienic influence; fourthly, that turpentine, camphor, and other products generated naturally in pine forests, also exhibit certain properties which render them valuable as sanitary appliances." (p. 125.)

"If we seek to establish the precise way in which the eucalyptus and the pine exert their hygienic influences, we are forced by exclusion to consider it in relation to the essential oils naturally formed in these trees, and to the emanation of which in a vaporous condition, they owe their grateful fragrance. We may ignore in this place the drainage power of the trees, because, although this is a valuable feature with them, it is one which does not concern the present considerations; and, moreover, it is common to all trees, though particularly exhibited in those which like the eucalyptus globulus grow so rapidly. Any sanitary effect due to mere drainage of water from the soil is of a purely negative character; whereas the hygienic influences of the *pine and eucalyptus are of a positive character.* These trees are healthful in themselves, and the emanations which, speaking generally, they diffuse into the atmosphere, are specifically efficacious as regards protection from malarial poison and its destruction. What, then, is the nature of this influence? is the question that must now be solved." (p. 127.)

"It was for a long time supposed that the oils to which plants and flowers owe their perfume, when exposed to the influence of atmospheric oxygen, influence it in such a way that ozone is produced; and hence it is stated in most of the older treatises on chemistry, as a fact that ozone is produced. It was beyond dispute that an active agent, resembling ozone in its properties, is formed in this way; but the precise and actual nature of this agent was (until established by the author's researches) an open question.

"There was a difficulty, however, in strictly diagnosing ozone from peroxide of hydrogen; and as the last-named substance was practically unknown outside the laboratory, whereas ozone was known to occur naturally in the atmosphere, the assumption, which came to be regarded as an established fact, was somewhat excusable." (p. 128.)

"Ordinary oil of turpentine representing the hydrocarbon part of the essential oils of different kinds of pine tree when analysed is found to contain 88·23 per cent. of carbon and 11·76 per cent. of hydrogen; and these figures lead to the chemical formula $C_{10}H_{16}$, as representing the constitution of turpentine. The mere analysis alone is not sufficient to fix this as the true formula; it might be C_5H_8 or $C_{15}H_{24}$ or $C_{20}H_{32}$, all of which substances would give the same percentage composition. There are, however, other considerations, of which we shall say more presently, which fix the *true formula of oil of turpentine hydro-carbon* as $C_{10}H_{16}$. This is called 'Terpene,' in order to diagnose it from other substances which accompany it in the crude oil." (p. 133.)

"A special property of all the terpenes consists in the avidity with which they absorb oxygen, either from the pure gas or from the atmosphere." (p. 134.)

"The experiments recorded in the next table were conducted by charging a number of very long-sealed tubes with equal volumes of air, oil, and water, and exposing them to summer sunlight for a few hours, and not sufficiently long for the whole of the atmospheric oxygen to be absorbed in any single instance. The residual unabsorbed gas was afterwards measured in the laboratory. Calling the largest amount of oxygen absorbed 100, then:—

1. Russian oil of turpentine absorbed	100·0
2. Swedish	100·0
3. Some oil which was obtained in Geneva absorbed	89·4
4. American oil of turpentine	78·9
5. Oil of eucalyptus	75·0
6. An evidently adulterated Swedish turpentine absorbed	52·6
7. "Scotch distilled American turpentine"	42·1

. . . . The absorption of oxygen (even from the atmosphere) by essential oils and the true chemical terpenes, takes place at the ordinary temperature, although of course it happens more slowly at a low than at an elevated one; more slowly therefore in winter than in summer; more slowly in shade than in sunlight; more slowly in the dark than in diffused daylight; and in all cases, even where pure oxygen is used instead of air, the products are identical so far as has been ascertained." (pp. 135-136.)

"The fact is established beyond doubt, that all oils which contain cymene or terpene, such as those of eucalyptus and turpentine, give rise to the production of peroxide of hydrogen, when subjected to the process described. [Oxidation in *presence of water* by a current of air.] (p. 143.)

"It has been further observed, in certain cases, that an oil of turpentine which absorbs oxygen from the air at any given rate, will absorb it *much less rapidly* if freed from accompanying oxidized substances by distillation. In other words when once the process of oxidation has begun, it continues more and increasingly rapidly, so that the greater the amount of oxidised matter contained in the oil, the greater the oxidation under given conditions.

"From these facts it may be inferred that in nature the process of oxidation as occurring in the immediate surroundings of the trees themselves, takes place, in all probability, much more rapidly than in the laboratory, since, as produced in the trees, the oil is accompanied with the products of oxidation to which reference is above made.

"It is indeed remarkable that turpentine, in the act of being oxidized, is capable of imparting to fresh turpentine the same and equal facility to absorb oxygen." (p. 144.)

"Accompanying the peroxide of hydrogen in the aqueous solution which is obtained by atmospherically oxidizing turpentine in presence of water, there is a small quantity of acetic, formic, and camphoric acids. There is also another substance present as a main constituent. . . .

"The aqueous solution of this new substance is very bitter, and *possesses most remarkable antiseptic properties*. . . .

"There is yet one other product which may be obtained from the aqueous solution resulting from the oxidation of turpentine over water. It is obtained in the free state by merely subjecting the solution to distillation when it passes over with the steam and condenses into a light coloured oil of a peculiar camphoraceous odour." (p. 146.)

"In recapitulation of the foregoing details, it may be stated that when turpentine is exposed to the action of the atmosphere, it absorbs oxygen and gives rise to the production of a peculiar organic peroxide which remains dissolved in the body of the oil, and communicates thereto properties resembling those of ozone and peroxide of hydrogen. Inasmuch as the oil is volatile, these properties are communicated also to the surrounding atmosphere. If the oxidized oil be treated with water, or, what amounts to the same thing, if the oxidation of the oil be conducted in the presence of water, then, on examination, the aqueous solution is found to contain peroxide of hydrogen, accompanied by a peculiar camphoraceous compound of the formula $C_{10}H_{18}O_3$. Along with these main products are also found small quantities of acetic, formic, and camphoric acids, and a third body, which, when isolated, is of a camphoraceous and oily nature, etc." (p. 147.)

"This chapter may be fitly concluded by observing that the process of atmospheric oxidation of essential oils is an exact imitation of the one which necessarily occurs in nature with every plant that secretes these so-called oils, and which is, of course, attended with the same results. So far, therefore, as any properties of pine and eucalyptus forests may be connected with the special presence of peroxide of hydrogen these are at once explained. In the next chapter experiments will be described to show that the different products are powerfully antiseptic in character." (p. 148.)

"The oxidizing powers of the aqueous solution are mainly due to the presence of peroxide of hydrogen, while the strictly antiseptic characters are mainly traceable to the camphoraceous ingredients." (p. 151.)

"Our first proposition, then, is as follows: 'In addition to certain other properties, a disinfecting material must be competent to prevent and arrest putrefaction, considered apart from innocuous processes of fermentation.'" (p. 154.)

"Our second proposition is: 'A disinfecting material for public use is not required of the same strength for all purposes; indeed, two or more forms differing in strength are desirable.'" (p. 155.)

"The third proposition is: 'A disinfecting material should possess oxidizing powers, so that it can destroy the products of putrefaction as well as prevent and arrest the process which creates them.'" (p. 157.)

"Our last proposition is: 'A disinfectant qualified for universal use must not be poisonous in itself, and must give no stain. In other words, it must be fit for universal application, and hence must not be destructive of life and property.'" (p. 157.)

"As is well known, most of the essential oils, and certainly those of turpentine and eucalyptus, exercise very decided antiseptic characters. But since in nature these oils, when generated into the atmosphere, *undergo oxidation in the presence of moisture*, we must test the properties of the products of oxidation if we would obtain a proper understanding of the sanitary influences of the pine and the eucalyptus." (p. 157.)

"It was from the well-known oxidizing effects of peroxide of hydrogen, and its consequent use as a disinfectant, that the author was first led to the investigation of this branch of the subject; and during the earlier experiments it was ascertained that beyond its well-known and valuable powers of oxidation it also exhibits many peculiar antiseptic influences. This was new to science.

"Having thus been led to the subject, the investigation was continued with a view of ascertaining and explaining the antiseptic and disinfecting properties of the mixed aqueous solution which *is obtained by oxidising oil of turpentine, or oil of eucalyptus by air in the presence of water.*" (p. 158.)

[Many experiments towards the explanation of some of its properties were communicated to the British Association Meeting, 1879, and are repeated in Mr. Kingzett's book.]

"Diseased matter may be rendered powerless to infect; and among agents capable of exerting this kind of influence, peroxide of hydrogen must be placed in a high position—one most probably due to its powerful oxidizing effects. In another chapter reference has been made to the further fact, that septic vibriones are killed by peroxide of hydrogen even when that solution is extremely weak. . . .

"Camphoric acid ($C_{10}H_{16}O_4$) being also a product of the atmospheric oxidation of turpentine conducted in the presence of moisture, some experiments were made with it, and it was found, weight for weight, to exhibit even more powerful antiseptic characters than salicylic acid, to which, as also to carbolic acid, it is chemically allied in some respects." (p. 162.)

"Equally striking are the antiseptic effects of the main product of the oxidation of turpentine which has been described. (Empirical composition $C_{10}H_{18}O_3$.)" (p. 163.) [Demonstrative experiments are then detailed.]

"Antiseptic properties are also possessed by the more volatile portions of the solution (those to which the odour is chiefly due, and such as are obtained on distillation of the solution). This feature makes the agent more valuable [see annotation, pp. 96, 97], since it is thus competent to act as an air purifier apart from a similar action presented by peroxide of hydrogen. It is therefore seen that every constituent of the solution in question [the result of the atmospheric oxidation of oil of turpentine in the presence of water] contributes towards its total effect as an antiseptic and disinfectant. Of course, it will be understood that acquaintance had been made with the characters of the solution as a whole, so far as that was possible, long before the experiments on its individual constituents were conducted, and long before the solution ever became known to the public in a commercial form as 'Sanitas.'" (p. 165.) [A number of experiments are then detailed.]

Professor Bentley, who has made a special study of the eucalyptus, observes: "The very interesting researches of Kingzett have proved that under the influence of air and moisture peroxide of hydrogen and camphoric acid are formed from volatile oils—the former a powerful disinfectant, and the latter an antiseptic; and hence I think there can now be no doubt that the healthy influence of eucalyptus trees is, to some extent at least, and probably more than we imagine, due to the volatile emanations from the leaves under the influence of air and moisture, possessing direct disinfectant and antiseptic properties."*

Mr. Kingzett says (Op. cit.), "It is probable [from what he has explained in Chap. VII.] that every molecule of oil of turpentine or oil of eucalyptus gives rise in this process of oxidation to a molecule of peroxide of hydrogen, and one of the camphoraceous body which has the approximate formula of $C_{10}H_{18}O_3$." (p. 185.)

"The antiseptic powers of such an immense quantity of camphoraceous material (as is given off by pine or eucalyptus forests), can be conceived if we reflect that a solution containing only a few grammes to the litre is sufficiently strong to preserve animal matter almost indefinitely free from decomposition, as demonstrated by experiment. . . ." (p. 186.)

"Now what is true about the eucalyptus and its oil is true also of the pine tree and its turpentine, and if anything, on even a more extensive scale." (p. 184.)

"Oil of turpentine is contained in the wood, bark, leaves, and other parts of the members of the *coniferæ*." (p. 187.)

"These different oils [classified as oil of turpentine] differ to some extent in their boiling points (average 160° C.), their specific gravity and their action on polarised light, but in a more ultimate chemical sense they are identical, and merely represent so many different isomeric forms of terpene ($C_{10}H_{16}$).

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* "Pharm. Journal," May 4th, 1878.

As produced in nature they are accompanied with certain oxidized products, and doubtless the natural resins and gums are formed by the action of atmospheric oxygen upon the terpenes existing in the trees." (p. 188).

"The process by which the turpentine is generally obtained from the trees consists in tapping them at regular intervals, and collecting the crude or brute turpentine, constituting a thick resinous mass, which is afterwards subjected to distillation, either with water, or steam, or otherwise.

"It is probable that the hygienic influence of the pine is much greater than that of the eucalyptus."

"The following further particulars I have derived from the papers of Dr. Julius Morel ('Pharmaceutical Journal,' Ser. 3, Vol. viii.) The tapping of turpentine may continue over 150 years, and more profitably if, *while the tree is young*, it is allowed occasional periods of rest. . . . A vigorous *pine standing alone* will yield annually 20 to 40 kilogrammes (44 to 88 lbs.) of 'crude turpentine.' But if the trees be massed together the individual yield amounts to only about 5 or 6 kilogrammes.* The yield of oil (by distillation) amounts to from 15 per cent. to 30 per cent. of the crude product, and averages about 25 per cent." (pp. 188-9).

" By the natural atmospheric oxidation of the oils of eucalyptus and turpentine there is produced an almost illimitable amount of peroxide of hydrogen and camphoraceous matters, which must perforce act, according to their chemical natures, upon the pestilence that may be floating in the air, and upon the animal and vegetable matters that may be rotting in the soil. . . .

"The Governments of this and other countries ought, therefore, never to lose sight of the value of eucalyptus and pine plantations." (p. 191.)

I commend the foregoing pages to the serious consideration of those speculators in land and houses in the district of Bournemouth to whom I referred in the beginning of this chapter, who shrug their shoulders and utter sceptical remarks with a view to discredit the value of the pines, which they are hungry to cut down for the sake of the ground upon which they stand. They may, however, collect some crumbs of comfort at the same time, if they will carefully observe one or two points which I will now point out, in order that they may take advantage of them for the benefit of the town and of the invalids who want their houses.

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* This is important with reference to Bournemouth clearings.

1st. Overcrowding of pines diminishes their hygienic value (see p. 105); therefore they may be thinned with advantage where closely planted, and the clearance of patches for the building of houses in the pine woods, and the cutting of paths and roads through them, by exposing the trees surrounding the clearings, places those trees in a more advantageous position for giving out their beneficent emanations (the yield being from 9 to 15 times greater).

2nd. These beneficent emanations are by no means confined to full-grown or old trees, but being given out by the foliage as well as by the wood, young trees, if luxuriant, are of great value, and as their foliage is nearer to the ground, their emanations are diffused more closely to persons in their proximity than in the case of tall and old trees. Therefore, if they plant with young vigorous trees all the available room now unplanted, in place of the trees cut down for building, and if, while clearing spaces for houses, they still keep these spaces surrounded by pines, they may year by year increase, instead of diminishing, the wonderful climatic influences to which I have referred.

I do not think that either the profession or the public were aware that so large a body of evidence could be brought together on this subject. And I believe that both will be surprised and impressed by its importance; and especially so, if we now place it in juxtaposition with the question of the value of Alpine winter climates in the treatment of disease, which excites so much interest in the present day.

The two desiderata—to secure which all the difficulties, inconveniences, and dangers of an Alpine winter have to be encountered, are—1, a rarefied atmosphere; 2, an aseptic atmosphere. Much difference of opinion exists as to which of these elements is the *sine quâ non* to the beneficial results—also, as to whether the advantages of one or both are counteracted by the extreme cold, at the cost of which they are purchased.

It was thought at one time that cold *per se* was the ultimatum to be sought after in the prevention of phthisis, and that altitude was simply valuable as a means of reaching a certain degree of cold. In this idea, "Kuchenmeister went further (even than Lombard), making the colossal generalisation that we could for every locality fix the highest level for phthisis. Further observations, however, have unfortunately shown this to be incorrect. Switzerland, even, does not quite follow this law, and the crowning objection appears in the inhabitants of the Kirghis Steppes in Central Asia, who, though resident 100 feet *below the sea level* enjoy a perfect immunity from phthisis.

"The *theory of great cold* falls to the ground when tested by the stern logic of facts. Greenland, the Shetland Isles, and Northern Scandinavia are all found to furnish contributions to phthisis."*

The first element obtainable by altitude, viz., rarefaction, is very complicated in its effects, but the two main factors are, 1, diminished quantity of oxygen in proportion to bulk of air, so that a larger quantity of air must be breathed to obtain the same quantity of oxygen for respiration as in atmospheres at sea levels; and, 2, increased expansion of lungs, so that by increased bulk of air respired the quantity of oxygen may be brought up to that inhaled at sea level.

These are certainly rather strikingly opposite factors; and yet it may be conceived that both might be employed with advantage if regulated with caution. Thus, the patient might be restricted in movement, and hence in depth of respiration, in the beginning, the lungs being supplied with little more than the average bulk of air respired at sea-level, although of such rarity as to supply a much less quantity of oxygen—so saving the tender lungs from hyperoxidation. This protective regimen might be continued until its full curative effects had been obtained upon the diseased parts; and then, cautiously, more and more exercise might be permitted, and therefore deeper and deeper respiration and greater and greater bulk of air would be obtained, till the over-expanded lungs could contain sufficient to supply the full quantity of oxygen in the rarefied air required for the purposes of physiological life and health.

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* "Dr. Dobell's Reports on Diseases of the Chest, 1875."

The importance of thus regulating the amount of exercise at high altitudes was brought by me before the Forty-seventh Annual Meeting of the British Medical Association, 1879.

In this "Note on the Value of Mountain Air in the Treatment of Phthisis," I said:—

"It is a conclusion which strikes the mind at once, that if we have to treat a patient in whom there exists—1. A constant flood of fresh oxygen brought into contact with the pulmonary blood by respiration, and seeking materials for oxidation; 2. Deficient supply of materials for normal oxidation, and blood deficient in such materials flowing through the lungs; 3. Excessively oxidized blood; 4. Impending or progressing abnormal disintegration of tissue by oxygen,—two measures are urgently called for: *a.* To supply the necessary materials for normal oxidation, by specially adapted medicinal foods, etc.; *b.* To diminish the influx of oxygen to the blood from the air.

"The latter of these measures would seem *primâ facie* to be easy enough to carry out by placing the patient in an atmosphere rarefied by altitude.

"But altitude, if great enough to have any material effect on the proportion of oxygen, and if long enough continued to have any abiding influence on the patient, almost inevitably means exposure to low temperature, with its attendant dangers, and it means increased afflux of blood to the lungs, at least for a time, with its attendant dangers to injured or morbidly vulnerable vessels.

"I am strongly of opinion, however, that much of the good with but little of the evil effects of altitude may be obtained, if only the main physical and physiological facts of the case, both with regard to the nature of the abnormal physiological state to be remedied, and of the effects of altitude upon the animal organism, are kept clearly before the mind, and boldly enunciated.

"Under their dictation, we shall *strictly forbid exercise to the consumptive patient while exposed to the effects of altitude.* I say 'boldly,' because this question of exercise is the rock upon which most cases are wrecked. Under the influence of sentimental and mystical notions about 'pure air and exercise,' patients are sent into high altitudes, with orders 'to invigorate their bodies, and their lungs especially, by exercise in the pure and lovely atmosphere;' and it is such deeply ingrained and popular twaddle as this which requires boldness on the part of the physician to upset it.

"The late Dr. Edward Smith proved by experiments upon himself that walking in health at one mile per hour increases the respiration from 500 cubic inches to 800 cubic inches per minute; at two miles per hour, to 1,000 cubic inches; at three miles per hour, to 1,600 cubic inches; and at four miles per hour, to 2,300 cubic inches per minute. Whilst with running moderately at six miles per hour, it is more than 3,000 cubic inches per minute. The depth of inspiration is likewise increased from 35 cubic inches to 100 cubic inches per respiration; and hence both the mechanical distension of the lung and the chemical and physical changes of respiration are greatly increased.

"Riding in a carriage increases respiration, but the degree varies with the oscillation of the carriage. In an omnibus the increase is fully half of the original quantity. On horseback at a walking pace, the increase is more than half; in trotting, three-and-a-half times; and cantering, three times the original quantity.

"Walking at the rate of four miles an hour will increase the rate of pulsation to about 130 per minute, and running at six miles per hour, to about 180 per minute; and even in gentle exercise there is some increase in the rate of pulsation.

"It is palpably absurd, therefore, to place a patient in a special climate with a view to diminishing oxidation, and then to order, or permit, that riding, driving, or walking should be practised, by which respiration, pulsation, and oxidation are all strained to their utmost.

"The very feature of the climate for which we seek its influence, viz., the deficiency of oxygen in a given volume, excites the respiratory and circulatory systems to over-action in vain attempts to obtain the customary supply of oxygen to the blood, and they need constant care to restrict them within proper limits. . . .

"Amidst all the difficulties of the subject, however, there is one practical conclusion which we may safely draw, and which I wish most emphatically to impress, viz., that if we seek to save oxidation by the influence of altitude, we must *forbid exercise.*"

Rarefaction of the atmosphere can only be obtained by altitude or by heat; but diminished respiration of oxygen can be obtained by other means, such as admixture of the air with watery vapour, and by rest; and *without rest,* as I have shown, rarefaction of the air does not secure diminished respiration of oxygen, but only respiratory distress.

The effect of rarefied air as a means of producing lung expansion is a totally different thing from its effects as a restrictor of oxygen, and is applicable to altogether different stages and forms of disease. But there are plenty of means of obtaining this result without resorting to great altitudes.

For the further discussion of this part of the subject I must refer to my paper "On the Importance and Dangers of Rest in Pulmonary Consumption,"* which I concluded with these words :—

> "It must be admitted that the proper regulation of this matter is one of the greatest trials of the astuteness of the physician, and it is almost impossible, unless he can make the patient and his friends comprehend its meaning and importance. But not less does it tax the skill and judgment of the physician to decide upon the moment when restrictions upon fresh air and exercise ought to be removed. The argument so often used when a patient appears to be 'doing well'—that 'it is best to let well alone'—may be fatal if applied to this case. The very fact that he is 'doing well' may be the sign that he must not be 'let alone,' that he is now in a state when we ought to accelerate histogenesis—to supply fresh oxygen—in a word, to set about the restoration of active nutrition. And then, again, how scrupulously should these new tasks be set; how carefully watched in their effects, lest even now they cannot be continued with safety! On the first sign of their being badly borne, they should be moderated or promptly stopped."

Now let us return to the second of the desiderata for which an Alpine winter is encountered—viz., an *Aseptic* atmosphere. It is obvious that the first of "the two desiderata to secure which all the difficulties, inconveniences, and dangers of an Alpine winter are encountered"—viz., a *rarefied* atmosphere—may be obtained by a resort to high altitudes in *summer*, by which many of the disadvantages are removed. The selection of winter, therefore, for the "Alpine cure" is based upon the necessity of securing the second desideratum—viz., an aseptic atmosphere.

And as a matter of fact it is upon this second desideratum that all the force of modern argument has been based, and that has been made the fulcrum of the petard by which fashion has hoisted patients into " winters of eternal snow."

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* "British Medical Journal," November 22nd, 1873. Reprinted in my work "On Diet and Regimen," etc., 7th ed., 1882.

Let us, then, consider most carefully the wisdom and necessity of such a painful exile, for the purpose of obtaining the desideratum aimed at.

The quantity of heat required to be generated in the body by the process of oxidation of food, etc., and the mode in which it is used in the organism, was carefully worked out by the late Mr. Farrant and myself, and published under the head of " Food, Heat and Motion."* In this summary we said : " The relation between food, heat and mechanical force has been the subject of some of the most important investigations of late years, and the light which has been thrown upon it is one of the greatest steps in the progress of medical science. . . . The mean consumption of oxygen by an adult man of average stature (weight 150 lbs.), taking ordinary exercise, is about 30 ounces avoirdupois in twenty-four hours, and the heat evolved by each 1 ounce of oxygen in combining with carbon, hydrogen, etc., is about 340 British units. Hence, 10,000 British units of heat will be evolved every twenty-four hours by the combination of 30 ounces of oxygen with carbon, hydrogen, etc. Therefore the food of an adult man should be such as may, in addition to other purposes, evolve at least 10,000 British units of heat. . . .

" The mode in which these 10,000 British units of heat are disposed of, and the purposes which they serve, may be seen in the following calculation, which has been made as nearly correct as possible :—

" Eight thousand British units are required as sensible heat to raise the temperature of the inspired air to the temperature of the body, to *vaporise the pulmonary halitus* (the expired water), *and to maintain animal heat.* The mechanical equivalent of 2,000 British units (equal to 690 foot-tons), is expended in actual work, more than half of which is employed in internal vital work (the mechanical work of the heart alone is equivalent to 200 foot-tons; respiratory and other vital movements may be estimated as equivalent to nearly 200 foot-tons more), leaving about 200 foot-tons available for external work, which may be represented by the labour of walking sixteen miles; but, of course, only so much is available for actual walking as is not used in the other external movements of the body which we daily perform."

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* " Dr. Dobell's Reports on the Progress of Medicine in Different Parts of the World." 1869.

It is evident from the above facts that in invalids and other persons deficient in force, and who, therefore, ought to economise it in every way they can, it is important that regard should be had especially to the 8,000 British units of heat, which "are required as sensible heat to raise the temperature of the inspired air to the temperature of the body, to vaporise the pulmonary halitus, and to maintain animal heat."

Consequently, it is a question of the most vital importance whether (*a*) we should obtain respiratory rest by mixing air of moderate temperature with the vapour of water at that temperature—which, by restricting the exhalation of watery vapour from the organism during respiration, will economise the heat and its mechanical equivalent required to "produce the pulmonary halitus," and thus will economise force for more important functions; also whether (*b*) we should economise the heat and its mechanical equivalent required to raise the temperature of the body to its normal point, and to raise the inspired air to that temperature, by the simple expedient of keeping the body in an atmosphere of which the temperature is not too low, and thus again save the vital force for internal and external mechanical work; or, on the other hand, whether (*c*) we should, *by placing a person in an extremely low temperature for the sake of obtaining rarefaction of the atmosphere by altitude*, call upon the organism for an extraordinary exhaustion of its heat and of its heat-producing powers for such apparently needless purposes as heating the inspired air, heating the water of the blood for expiration, and heating the substance of the body itself: all of which can be done by artificial means at an enormous economy to the vital force.

It appears to me that common sense and reason rebel against such an extravagant course, unless it is essential for the purchase of some advantage—some desideratum of incalculable value—not obtainable in any other practicable way.

Dr. Wise says, in writing of the Alpine cure:* "Many deaths have occurred from the inability of feeble persons to withstand the cold. . . . . We have not only to consider the low temperature with sunlight and calm air . . . . but the introduction to the winter, with its frequent changes attended with rain, snow, fog, etc., must not be forgotten. . . . . It is misleading and cruel to make light of this." (pp. 52, 54, 55.) And Mr. Otter says:† "It is of the greatest importance that invalids who go to Davos should have a fair reserve of physical vigour to enable them to resist the intense cold which they are almost sure to meet with in some parts of the winter." (p. 157.)

The question then occurs, Is there this wonderful desideratum only to be obtained by means of altitude accompanied by an extremely low temperature of the air?

I believe the answer to this which will be promptly given by many at the present day is:—"Yes, certainly; one worth any sacrifice; viz., AN ASEPTIC AIR!"

Thus, one of the most enlightened physicians in this or any country, Dr. Clifford Allbutt, of Leeds, in the *Lancet*, June 8th, 1878, wrote:—"For many years I have held that the majority of phthisical patients die of *septicæmia*, and that the arrest of this daily re-poisoning is a primary object of treatment. To reach, cleanse, and dress ulcers of the lungs by surgical methods seems impossible; . . . . if, however, there be an *antiseptic climate*, we may hope to counteract this secondary blood-poisoning by sending our patients to live in it. Such antiseptic or aseptic [very different things] climates are found in Switzerland, in Upper Egypt, and in other districts; and in the mountain air of Switzerland there is found also a tonic virtue which no doubt largely aids the physician in his work. The aseptic state of the air on Alpine heights has been proved by Professor Tyndall's experiments at the Bel Alp; but the Bel Alp, in common with most Alpine resorts, is insufficiently sheltered. . . . In Davos alone, so far as we yet know, is found an air at once aseptic, bracing and still."

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* "Davos Platz and the Effects of High Altitude on Phthisis." By Alfred Wise, M.D. 1881.

† "Winters Abroad." By R. H. Otter, M.A. 1882.

And, September 19th, 1879, Dr. Burney Yeo wrote to the *Lancet*:—"the following paragraph occurs in a paper I contributed to the annual meeting of the British Medical Association at Sheffield in 1876, 'The (mountain) air is, as I have already said, antiseptic; it is clear, bright, and pure, and there is *an almost entire absence of those organic particles which play such an important part in promoting putrefaction*.'"

In writing on the mountain climates of New Mexico and the Rockies (Op. cit.), Dr. Hilgard Tyndall says: "Germ pathology is now sufficiently far advanced to justify us in accepting the fact of germs (bacteria) being the 'ferment of contagion,' the organisms which usher in putrefaction in phthisis (I am not satisfied of the specific character of the tubercle-bacillus), to cause us to reflect upon the importance of excluding further invasions from without, and to check proliferation within, if not to destroy the already existing breed; and, lastly, to reason from the premises of the known facts, that low lands with warmth and moisture are the breeding grounds of septic organisms. Now a truly aseptic atmosphere should not be steadfastly warm or hot, not loaded with moisture, as the result of evaporation of large bodies of moisture on the one hand, while the geological substratum of a chosen locality should not admit of subsoil moisture on the other. The importance of subsoil moisture in the development of pulmonary consumption was urged by Dr. Bowditch, of Boston, as early as 1862."

"Of all the conditions necessary for a healthy climate," says Dr. I. More Madden, "one of the most essential is purity of the air; that is, freedom from malaria or miasmatic emanations, or from the atmospheric contaminations produced by the crowding together of vast bodies of men, or evolved by manufacturing or chemical processes." (Op. cit., p. 10.)

No one can be more impressed than myself with the advantages, with *the unspeakable importance* I might say, of antiseptic treatment in all forms of disease, but especially in those involving destruction of such delicate vascular and perivascular structures as the lungs and respiratory passages. Indeed, I may fairly add in this place what I said in my work "On Loss of Weight," "it was under the dictation of this train of ideas that I was led to insist upon the importance of local antiseptic treatment by means of inhalations, and to make it a leading feature of my treatment of phthisis at the Royal Hospital for Diseases of the Chest, and in private practice, long before its importance was so generally accepted as it may be said to be in the present day,—long before Antiseptic Surgery had opened the mind of the profession to the importance of antiseptic medicine . . . .

"It should be our constant object, by the use of antiseptics, to stay the decomposition, and to disinfect the products of decomposition *in situ* wherever they can be found and reached. It is with this view that I have always made inhalations of creosote, carbolic acid, or turpentine a leading and essential part of my treatment of destructive lung diseases." (Op. cit., pp. 205, 218.)

On the subject of antiseptic treatment "Dr. Annelli * remarks that the development of phthisis after hæmoptysis is neither due to the irritant action of the blood entering the bronchi, nor to the action of the air upon the effused blood, but to the entrance of infected matter into the pulmonary tissue which has become looser in its continuity by the hæmorrhagic matter. . . . He therefore concludes that in hæmoptysis not only hæmostatic but also antiseptic treatment should be adopted." *

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* "Gazzetta Medica Italiana Lombardia," Feb., 1877.

But surely it is not necessary to confront the rigours of an Alpine winter in order to obtain an antiseptic atmosphere, or to submit a patient in the most emphatic sense of the word to antiseptic treatment!

Does Sir Spencer Wells in his most critical exploration of the peritoneal sac, or does the great pioneer and hero of antiseptic surgery himself take his patients to the top of a mountain, with the temperature at zero, before he dares operate upon them in perfect accordance with the rules of Listerism?—Certainly not! Nor do we find any such step even suggested in the latest article on antiseptic treatment in "Quain's New Dictionary of Medicine."

"Antiseptic treatment," it says, "is treatment directed against putrefaction, or rather, as now generally understood, against the development of fermentative organisms . . . .

"In surgery, the employment of the antiseptic method is based upon the theory which attributes putrefaction and its consequences to minute organisms (bacteria, etc.), derived from without. . . .

"In addition to other measures, there must be an antiseptic atmosphere provided, so that the air which gains access to the wound or abscess may be innocuous. This is secured by means of a spray of one to forty carbolic acid solution, for the production of which Lister's portable steam apparatus may be used. . . .

"In medicine, antiseptic treatment is based upon the hypothesis that infectious and contagious diseases are caused

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* "Dr. Dobell's Reports on Diseases of the Chest." 1877.

by the presence and multiplication in the human organism of minute parasites termed microzymes, microphytes, micrococci [and Bacilli]."*

Still more must we pause before we admit that the attainment of *only an aseptic* atmosphere is worth all the sacrifices to which I have alluded, when we have closely considered its nature.

It might, perhaps, be otherwise if the atmosphere of Alpine heights were antiseptic as well as aseptic. There is a vast difference between the two, which I fear is very often overlooked! There is a vast difference between an atmosphere which simply will not create miasmata, or micromes, etc., etc., and which will not excite putrefactive processes, and one which will also *destroy them when they already exist.*

Now there is no evidence that Alpine climates *per se* are antiseptic, however they may claim to be aseptic.

Hence they have but a limited power, after all, in preventing septic diseases — because they cannot stop their progress when septic changes have begun; and still more hopelessly, in a practical sense, do they prove to be impotent directly they are tested by the crowding together of human sufferers.

An aseptic air is aseptic only while it is unpoisoned by the emanations from organic life; and, therefore, although any special atmosphere may be aseptic so long as a few scattered inhabitants are dotted about in the pure air, experience has already shown how impossible it is to retain this negative (aseptic) quality when masses of invalids are collected in undrained villages and congregated for months in even the best regulated hotels and boarding-houses.

Thus mountain sanatoria, like military camps, must either be always "moving on," or else become hotbeds of septicæmia instead of aseptic Eldorados!

Even in 1881, Dr. Wise wrote—"At present Davos possesess the name and reputation of a Sanatorium; but it appears likely to become overcrowded, and the benefit of living among a sparse population in scattered dwellings will be modified by the drawbacks of dwelling in a closely-built village, which change seems slowly but surely approaching.

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* "Quain's Dictionary," Op. cit., "Antiseptics"; also "Bacilli" in Appendix.

"The emptying of cesspools and accumulations of manure from cowsheds, etc., during the autumn months, for manuring the grass preparatory to the snow-fall, is a nuisance which requires serious attention; and it is a matter of regret that the inhabitants still adopt a system of drainage conducted on such primitive principles." (Op. cit., pp. 49, 50.)

And in 1882 the following letter appeared in the "Lancet":—

"Sir,—In 'The Lancet' for January 21st you gave some extracts from a letter of Mr. J. A. Symonds concerning the disgracefully insanitary state of Davos Platz. I have just returned to England, after a residence of six months in Davos, and can fully confirm all that Mr. Symonds says about the entire absence of even the most elementary system of drainage. Building has been going on with great rapidity for the last few years, houses being run up in all directions, entirely regardless of suitability of site for drainage purposes. The smell resulting from this state of things is disgusting, and several cases of sore-throat which occurred during my stay in Davos were undoubtedly due to defective sanitary arrangements. That the evil is rapidly on the increase may be judged from the fact that the smell is much worse at the present time than during the hottest weather in July. I believe that it is owing to the wretched sanitary state of the place that visitors who seek Davos for their health do not make such good progress as was formerly the case. It is absurd to send patients who require, above all things, pure air to a place reeking with stinks, as Davos is. Some attempts have been recently made to induce the authorities to take steps to bring about an abatement of the nuisance, but hitherto with little or no result. It is almost incredible that the hotel-keepers, who are the principal men of the place, do not see that unless the existing state of things is speedily remedied, Davos, as a health resort, will be a thing of the past, and their business fail for lack of visitors.

"As long as physicians send patients to Davos in such numbers, so long will the present disgraceful state of things continue. If those who are in the habit of ordering their patients to winter in Davos would refuse to send any more there until they are well assured that the existing sanitary defects are remedied, the authorities would soon see the necessity of bestirring themselves in earnest. I fear that Davos Platz is permanently injured by overbuilding, but there are other places near—*e.g.*, Davos Döufli, Frauenkirch, and Weisen, which are not yet overcrowded, and are probably equally well fitted for the treatment of pulmonary complaints.

"I am, Sir, yours faithfully,
"R. D. H. Gwillim, M.R.C.S.

"Rozel, Marlborough, Jan. 25th, 1882."

Oct. 18, 1884.—Mr. Robert Louis Stevenson, a warm admirer of Dr. Rüdi and of Davos, wrote me (for publication if I pleased) as a reason for not again going there :—"The crowded hotels, somewhat over-heated, not always perfectly well drained, are the great objections. I have sat down to table one of seventy persons, fifty of whom I calculated were phthisical, or so inclined. The meal lasted long, the air became oppressive, and I was always driven from the room before dessert." After enumerating some cases which came to his knowledge while there during two winters, he added : "These circumstances point in one direction—to an air charged with germs."

These complaints have grown stronger winter after winter, and this year The Maloja is holding out a new camping ground, "with good sanitary arrangements and the absence of those urban characters which are rapidly modifying the aspect, and indeed the curative effects of

Davos,"* while a large party is to winter at undrained St. Moritz.

In the hope of avoiding at The Maloja the insanitary drawbacks of other Alpine winter stations, the new Kursaal, calculated to hold 500 patients, is fitted up with the most elaborate arrangements. Thus Dr. Wise says, in his new book on "The Alpine Winter Cure":†—

"The system admits of being adjusted to suit any temperature or degree of humidity of external atmosphère. . . . By the double means of propulsion and extraction furnished to each chamber, the breathing space exceeds by 0·6 times the estimate given by one of the greatest authorities for ventilating soldiers' barracks at night. . . .

"In the basement . . . are placed 3 *chaudières,* in which steam is generated to a low pressure (1 to 3 atmospheres), etc. . . .

"The ascending power of the warmed air at a temperature of 122° Fahr. raises it through conduits to each room in the house. . . .

"To allow of the escape of used-up air, two tubes of exit are placed in a chamber, one under the bed, for the escape of the heavier impure gases, another near the ceiling to liberate the lighter impurities. . . .

"The atmosphere of any special chamber can be medicated at will by placing *an antiseptic* agent above the valve of the *batterie* in the air tube supplying the apartment. . . .

"By the simple adjustment of the valves in a room the temperature can be regulated with nicety. . . .

"With this system various therapeutic agents of undoubted importance are placed under immediate control, viz.: 1. Temperature; 2. Moist fresh air; 3. Dry fresh air; 4. Volatilised remedial agents. In addition, ozone, generated by a powerful apparatus placed in the vestibule, permeates the corridors and passes to the *salle à manger*, *théatre-salon*, *salle de lecture*, etc., by means of a 'blower' and tubes." (pp. 70, 75.)

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* "Birmingham Medical Review." October, 1884.

† "The Alpine Winter Cure; with Notes on Davos Platz, Weisen, St. Moritz, and The Maloja." By A. T. Tucker Wise, M.D. 1884.

It is undoubtedly a cause for thankfulness that, if five hundred sick persons are to be shut up during the long dark days of an Alpine winter in one habitation, such excellent expedients should be at last resorted to, to obtain for them some little at least of the *aseptic* air they go so far to seek.

But unfortunately even these precautions cannot stretch the hours of sunlight in an Alpine valley.

Dr. Wise says (Op. cit., pp. 67, 68): "One of the most important features of Alpine climate—and one which unquestionably acts as an adjuvant in the chemical process of the natural and healthy change taking place in the blood discs—is the *amount and duration of sunlight.*

"Were it not for the transparent air and powerful sun, the high altitude would be quite unsuited to delicate people." And he adds:—

"Sunrise and sunset take place on the 1st of January as follows:—

	Sunrise.	Sunset.
Maloja	9.35 ...	3.45 p.m.
Weisen	10.35 ...	3.45
Pontresina	8.30 ...	3.10
St. Moritz	10.0 ...	3.5
Davos Platz	10.3 ...	3.0
Andermatt	11.45 ...	3.15"

So that 6 hours and 10 minutes is the longest period of sunshine in the list; and it is well known how sudden is the transition from light to darkness in Alpine valleys.

On the same day of the year (January 1st) the sun rises at Bournemouth at 8.14, and sets at 4.8, equal to 7 hours 53 minutes of sunlight; and, in consequence of its elevation upon a plateau on the south coast, daylight begins some time before sunrise, and lingers long after sunset. (See Chapter II.)

In the recognition of the necessity, which undoubtedly existed, for such well-devised and elaborate apparatus at The

Maloja for *neutralising* on the one hand, and *creating* on the other, dry air, cold air, pure air, aseptic air—the chief characteristics hitherto claimed as the impregnable natural fortresses in defence of the winter mountain cure for diseases of the chest—we see the first signs of a well covered retreat from an untenable position. And we may hope next to see the day when mountain sanatoria will be only resorted to by *poitrinaires* during the *summer* months, the winter being reserved for the numerous sufferers from brain-fag, jaded nerves, some phases of ennui, various forms of cachexia, and a certain picked number of cases of threatened tuberculosis in persons otherwise fairly vigorous in health, and in whom *no lung disease has yet begun.*

But patients with diseases of the lungs will keep to safer and more suitable quarters, at least till winter is over.

Every new advance in modern scientific research adds proof to proof that what we want and must have for the prevention and cure of the *diseases of gregarious animals* is not only an aseptic but a definitely and potently *anti*septic atmosphere. And when we review the evidence I have adduced in the foregoing pages of the extraordinary properties of the emanations from pine and eucalyptus trees, we cannot fail to be impressed with the wonderful and beautiful provision which has been made by nature for the prevention and treatment of disease by *antiseptics in the midst of human habitations.*

In the wise arrangements of creation it has not been made essential to the health of human beings that they shall be torn from their domestic surroundings, from the reach of those they love, and from their means of livelihood and of intellectual life, and exiled to the eternal snows! Nor has it been ruled that only those who can be so exiled shall be cured of their diseases;—that devoted mothers, sisters, daughters must die or desert their sacred posts! We need no longer stand and wonder that, "Climate plays no more sovereign part in human affairs. Holland and England compete in mists and fogs. Their inhabitants have been unsurpassed in energy and versatility. The soft climate of Italy and Greece did not hinder Athenians and Romans from conquering empires. Northern frosts have been compatible with military and political supremacy. Lords of the world have sprung from the mud of the Nile and from the hot plains of Assyria. No variety of atmosphere can be mentioned which has not coincided with the production of specimens of intellectual and political ascendancy among mankind. Born mountaineers, who breathe the most inspiring air, and know how real sunshine feels, have seldom moved the world in any sphere—moral, mental, military, political, or commercial. In mountainous countries ruling minds have been reared in the valley rather than on the hill-top. The city of Geneva, 'which for weeks together sees little or nothing of the sun,' has borne a part in the history of human thought denied to the neighbouring region of beautiful light and lightness. Mighty as is climate among human circumstances, it remains a circumstance. . . . . Happily it has been so ordained. . . . . Morasses and glaciers and wind-swept peaks are not made for human habitation . . . . and of regions such as our correspondent catalogues, bracing, but not too bracing, where there is grass as well as sunshine, and other forms of life than the chamois can flourish, the supply is naturally limited. For a nation there is not enough; and, if there were, a nation hardly would profit by being settled among them. There is plenty of them for playing fields, and that is their proper destination."*

But the pine will grow and flourish wherever human beings can form a home—from the level of the sea up to the line of perpetual snow.† And wherever the pine and its turpentine-forming sap, and its neverfailing foliage can be distributed, *in a proper proportion to the population*, among the homes of men—the atmosphere can be kept pure, not only aseptic but antiseptic, by nature's own processes, independent of other influences than a certain amount of sunshine and a certain amount of moisture—elements which, like the pine itself, can be found wherever human beings can form a home.

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* The "Times" Leader, Sept. 18th, 1884.

† See Keith Johnston, Op. cit., p. 163.

To re-quote Mr. Kingzett's words:—

"It is probable that the hygienic influence of the pine is much greater than that of the eucalyptus, since it has a much wider and more extensive distribution in nature. Thus Russia alone has 500,000,000 acres of forestry, largely consisting of pine trees; while . . . a large industry is carried on in turpentine products yielded by the pines and firs of not only Russia, but also Switzerland, Germany, Sweden, and Austria. The European trade, however, is not so large as the American one, which now furnishes most of the turpentine met with in commerce. . . . Besides the vast pine forests of America, Russia, and Sweden, there are the pine woods of Arcachon famous for their healthfulness, and particularly grateful to persons suffering from pulmonary affections. Even in our own country pine woods abound, not merely in Scotland, but scattered over the entire area. They are to be found so near London as Upton, Weybridge, and Bournemouth. . . .

"By the natural atmospheric oxidation of the oils of eucalyptus and turpentine there is produced an almost illimitable amount of peroxide of hydrogen and camphoraceous matters, which must, perforce, act, according to their chemical natures, upon the pestilence that may be floating in the air and upon the animal and vegetable matters that may be rotting in the soil. . . . The Governments of this and other countries ought, therefore, never to lose sight of the value of eucalyptus and pine plantations." (Op. cit., pp. 189, 190.)

Let me conclude this chapter by an earnest appeal to all whom it may concern in the district of Bournemouth and its surrounding country to plant, plant, plant coniferæ—any form of turpentine-producing tree and shrub—but especially the Pinus sylvestris, Pinus maritima, Pinus Austriaca, Pinus strobus, and Pinus Californica. In every nook and corner where space can be found let a pine be planted, and on every heath and common far and wide. And I would also appeal to my medical colleagues to supplement these means of health, where they are deficient, by the use of terebinthinate vapours in the rooms of patients and in other parts of the dwellings both of the poor and of the rich, so as to *keep up a due relation* between the quantity of the antiseptic and the number of the population. And once more I may remind my readers that *moisture-laden sea breezes and sunshine* are the special agents by which the necessary chemical changes are developed and intensified.*

The following cases may be given to illustrate some of the beneficial influences of an antiseptic atmosphere in treating disease :—

Case VIII. Feb. 1883. Mr. ——, æt. 40. Gangrenous abscess in the upper part of left lung; probably some of the bronchial glands. Fœtor horrible (no bacilli). His doctor wrote :—" Illness commenced about five or six weeks ago with a cold. I saw him after he had been ill a week. There was some dulness and crepitation at the apex and right base. Convulsive dry cough, almost retching. No rigor; temperature and pulse normal. Three days after this, temperature 103° morning, 102° evening, and he coughed up suddenly about half-an-ounce of stinking, putrid, brownish pus; this was repeated occasionally for two days, temperature gradually becoming normal. Physical signs unchanged, except that crepitation at right base disappeared (probably purulent infiltration). . . . Since this, every two or three days he has had severe fits of coughing, and has expectorated two or three lumps of thick pus. Things went on as I have described for a month from the beginning of illness, when one night, during a fit of coughing, he brought up half-an-ounce of blood. Temperature rose to 100°, but fell next day. Physical signs have not altered.

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* DIRECTIONS FOR MEDICATING THE ATMOSPHERE OF A PATIENT'S ROOM.—Put the materials to be vapourised into the upper (earthenware) portion of a small " Clark's Pyramid Food Warmer." Put boiling water into the lower (metal) portion. Light the Pyramid Night Light and place the whole (without the lid) in a wash-hand basin, or tray, upon a table about four feet from the patient's bed, and let it remain there all night. The sitting-room may be medicated in the same way when required. See p. 204 of the Author's work " On Winter Cough." 3rd Edition. 1875.

When seen by me, in Bournemouth, he was very weak and cadaverous. He was staying in a very protected part too low down (about 49 feet above sea level) and did not do well. He lost strength, but he liked his lodgings, and resisted changing. I at last persuaded him to move to 120 feet elevation near the edge of the West Cliff. He was then so ill he could not get out, and I placed him under Dr. ——'s watching. No alteration was made in treatment, but the change of residence had a marvellous effect, and he rapidly recovered to such an extent that he wished to go back to London to business. I, however, would not allow this, and he went to Brighton to be nearer home. He wrote from Brighton:—

"There is no smell to the expectoration. . . . I will stay here two or three weeks before I go back to London."

Case IX. December, 1882. Mr. ——, æt. 31. Consulted me in Harley-street, saying "he had arrived last night from Winnipeg, having travelled straight through to London for the purpose of taking my opinion and advice."

Said to have been well till he caught cold when temperature was below zero, and had pleuro-pneumonia of the left lung, or possibly of both, leaving abscess of the left base. One brother died of consumption at 19, and one at 21.

He had lost flesh and sweated at night, and was much debilitated; cough very distressing; expectoration copious and offensive. Vestiges of extensive pleuro-pneumonia in the lower part of the left lung, with a large abscess containing much secretion, which was frequently expectorated, but with great distress, the spasmodic character of the cough occasioning retching.

The upper part of the right lung was catarrhal, but that side otherwise normal; the *upper* part of the left lung was dull, and at first it was thought a small deep cavity was there, but this appeared afterwards to have been due to conducted sounds from the basic cavity.

As he had no special place to go to in London, and had his wife with him, I sent him next day to Bournemouth, to Bourne Hall, under Dr. Philpot's care, and promised to see him next time I visited Bournemouth. I examined him April 5th, 1883, and found a marked improvement in general and physical signs. He came to London in the summer, and went to Eastbourne and Hampstead, but he did not progress so well, and at Hampstead he was laid up with severe bronchial catarrh, and became extremely weak, sweating profusely; and as soon as he could safely travel, he returned to Bournemouth, where he remained throughout the autumn and winter of 1882-83, making great progress. All morbid physical signs cleared in the right lung, and in the left became limited to the still unhealed abscess. His weight had become good, and his general health restored. No signs of septicæmia.

I taught him to empty his cavity night and morning by assuming a "salaam" position, which saved him much fruitless coughing.

He was anxious to return to Winnipeg on financial business. I allowed him to go home so as to arrive there in the lovely summer of that climate, and with orders to go to Colorado at the breaking up of the next winter's ice. He felt quite equal to the undertaking.

This case presents a peculiarly interesting accidental comparison between the aseptic influences of an Arctic climate in which he contracted his disease—and in which it was progressing—and that of Bournemouth supplemented by antiseptic and other medicinal treatment in which it was arrested —and speaks decidedly in favour of the latter.

October, 1884. I heard by accident from a patient, who had met Mr. —— in travelling last spring, that he was going on well, and spoke in the most grateful terms of his residence here.

Case X. Mrs. ——, æt. 28. Note, January, 1883. Has been four weeks at Bournemouth, on the east side of the valley bank, altitude above 100 feet; doing well.

History of: Puerperal fever 18 months ago; pleuritic effusion, aspiration; empyæma, aspiration, and counter-drainage-opening. Drainage tube still in, obstinate discharge from fistula; daily discharge about half-an-ounce. Tube now enters about four inches, will not turn, and produces bleeding when moved.

Left side dull from apex to base, but respiratory sounds are gradually creeping from above downwards. Loud systolic, mitral bruit back and front.

Left side from spine to ensiform, 11½ inches.
Right side, do. do. 12½ do.

She returned to London at the end of April, 1883, with perfectly recovered health, all functions normal. Fistula *in statu quo*. No morbid lung symptoms and respiratory power increasing.

Case XI. March, 1884. Master ——, æt. 14. Brought up from the North for my opinion, with vestiges of pleuro-pneumonia of the left lung, the whole of which was still dull. Copious cavernous gurgling at the back, below the blade-bone, and disintegration signs in the upper lobe in front. The heart was drawn up, and very little respiration could be heard in the lower half of the lung in front or at the side. The boy was in a wretchedly low and miserable state, mentally and physically; he insisted on swallowed all his expectoration, so that none could be analysed.

He had whooping-cough, Christmas, 1882, and went to school in the North (far from home) with cough; went home in July with cough, but otherwise considered well. His chest was examined then, and said to be sound. Returned to school in October, and in November his mother was wired that he was "dying of inflammation of the lungs," and two physicians were in consultation on the case with his school doctor, who said the case had been neglected in the early stage, before medical aid was sought. Temperature charts varied from 103°, November, to 101·8° end of December, 100° January, 99·8° February, and after that sub-normal. He had been well treated, but was not getting on at all. He was placed upon Fellows' syrup of hypophosphites, restorative diet, pancreatized food, and antiseptic vapours and inhalations, and especially ordered to live out of doors and ride on a pony as much as his strength allowed. His improvement was rapid, evidently from the change of air, for the treatment in other respects was not very different from that he had been under in the North. His parents thought him so well at the end of six weeks that they took him home—much sooner than was wise—but I heard afterwards that he had no relapse.

Case XII. Lieut.-Colonel ——, æt. 57. Consulted me in London, 1877, concerning the vestiges of pleuro-pneumonia and recurrent hæmoptysis, due to a bullet-shot through the left lung while on duty in India in 1857, which had been excited into recent activity by an attack of bronchitis three weeks before. He was spanæmic and lithæmic, very tall and thin. He went to reside at Bournemouth.

January, 1884. I was called to attend him, in consultation with his family doctor at Bournemouth, who said he had been suffering from an attack of broncho-pneumonia. We found a large pneumonic abscess, in the site of the old gun-shot wound, at the back of the left lung; much diffused capillary bronchitis, considerable purulent expectoration from the abscess, as well as from the bronchitis,—and great exhaustion. After a hard struggle to prevent him from sinking, and just as he was beginning to mend, he was attacked with acute diaphragmatic pleurisy of the *right* side and broncho-pneumonia of the lower lobe on that side. His sufferings and exhaustion were so great that his doctor wrote: "Can you suggest any relief? The case is urgent, he cannot stand this long." We found him loaded with uric acid, as on his first visit to me in London. We acted upon this clue, and saturated him with alkaline citrates and quinine, while persisting in highly restorative food, and as he, fortunately, had a great affection for blisters—in consequence of the good they had done him before—he indulged himself freely in their use, applying one wherever he felt pain.

But the point I specially wish to note is that finding so considerable an abscess in the track of the old wound, and so much diffused inflammatory mischief around, and patches of inflammation setting up in other parts of both lungs, we considered that much might depend upon purulent infiltration from the abscess; and we therefore instituted most efficient antiseptic treatment by vaporising antiseptics in his room, and also using them on a respirator occasionally.

After lying for some time in an almost hopeless condition, persevering in antiseptics, he made a steady recovery, and was able to visit me at my house in March, 1884. The abscess continued to discharge, but gradually diminished in area, and no bacilli were found in the expectoration.

October, 1884. He called to ask permission to go and shoot in the North, feeling quite equal to the exertion; and on examination I found no gurgle left, but there were dulness and contraction of the chest in the site of the abscess. General health quite restored.

This patient's house was large and well kept hygienically, in an elevated and breezy part of Bournemouth, altitude about 124 feet, but far removed from the sea, and although in sight of the pine woods, too far off to benefit much from their antiseptic emanations, which we therefore supplemented artificially. But he had the full benefit of the pure air, the dry soil, the sunshine, and the facilities for healthful exercise directly he was able to bear it. To these and to the supplemental use of antiseptics we must largely attribute the success of the medical treatment in a very unpromising case.

For further cases, see Chapter V., "Medical and Clinical," and Chapter VI., "Disease Tracts," etc.

CHAPTER V.

MEDICAL AND CLINICAL.

The Delusion of a Specific Climatic Cure for every Disease—Consideration of the "Conditions of Existence" which give the greatest Chance of Successful Medical Treatment—Statement as to who should not be sent to Bournemouth—Cases illustrative of "the Conditions of Existence" at Bournemouth—The Chief Elements of these Conditions discussed:—*a.* An Atmosphere pure and clean, free from the Contaminations of a Crowded Population and of Injurious Manufactures, and in this sense Aseptic. *b.* An Atmosphere disinfected and dezymotized by *Anti*-septic Influences. *c.* An Atmosphere neither irritating by over-Dryness nor relaxing by over-Moisture, its Humidity being Saline and impregnated with Antiseptics. *d.* An Atmosphere in which *Dampness* is impossible. *e.* An Atmosphere moderately mild and fairly equable. *f.* A Climate free from the Causes of Marine Cachexia. *g.* Wide Expanse and long Duration of Sunshine. *h.* Freedom from over-cold Nights in Winter and over-hot Nights in Summer—Proximity to the Sea almost a *Sine quâ non.* *i.* Brightness and Cheerfulness of the Place and its Surroundings—The Birds sing at Bournemouth every Week in the Year. *j.* Absence of Fog—Bournemouth should rise in Arms against any Attempt to build Smoking Manufactories or Closely-packed Houses, from which at present it is eminently free. *k.* Facility for getting Air and Exercise and varying the Scene—Importance of Horse, Pony, and Donkey Riding—Relatives accompanying Phthisical Invalids require Protective Regimen—Hunting Appointments. *l.* Facility for slight Changes of Climate in all Seasons, without Risk, and without Sacrificing the Leading Qualifications—Illustrative Cases. *m.* Well-constructed Houses, well served. *n.* Quality of the Water—Dr. C. Meymott Tidy's Analysis of Bournemouth Water. *o.* Importance of First-rate Medicaments, Medical Appliances, and Medicinal Foods, Easily obtainable—Bournemouth Chemists specially good. *p.* Importance of First-rate Medical Advice, and Care—Bournemouth has Always been Noted for this.

q. A Sanitary Hospital for the Isolation of Infectious Cases. *r.* The Mont Dore Establishment for carrying out the "Mont Dore Cure" at all Seasons—Statement of its Special Advantages as a "Condition of Existence" at Bournemouth—Cases further illustrating the Effects of the Conditions above enumerated.

As I said in my Preliminary Observations—happily the day has passed when it was believed that there must be a *specific climatic cure* for every disease. No professional or popular delusion has led to the sacrifice of more lives, or to more domestic disruptions, blasted hopes, and weary, disappointed longings for that which, while impossible, was still believed to exist.

The conviction of to-day, that even the most typical climate is only a more or less powerful adjuvant to other medical treatment—a more or less favourable "condition of existence"—brings us within the regions of reason and common sense.

"There is, in fact," says Dr. Hassall, when speaking of the beautiful climate of San Remo (Op. cit., p. 242), "no such thing as a perfect climate to be met with on the face of the earth. There must be winds, rain, sunshine, clouds, and variations of weather everywhere. An unvarying climate would be anything but health-giving." (See also Chap. IX.)

Nevertheless, we ought not, because we cannot find perfection, to throw up the game, and apathetically sit still in the midst of removable disadvantages.

When we learn such general facts as Dr. Aitken enumerates in the following passage, it is only a natural and common sense proceeding that we should try to shift our sails to the wind:

"As the sun proceeds northwards in the ecliptic, so the sickly season advances from the southern to the northern islands. In the Mediterranean the mortality is doubled in the hot season, between July and October; and in the Northern States of North America, the posts of the army are regularly abandoned as the hot or sickly season approaches.

In temperate regions this order is reversed. Throughout Europe generally, *the maximum mortality occurs at the end of winter*, and the minimum in the middle of the summer. The Registrar-General of England calculates that a fall of the mean temperature of the air from 40°, to 4° or 5° below the freezing-point destroys from 300 to 500 of the population of London." (Op. cit., Vol. II., p. 1020.)

So, therefore, it easily occurs to the mind of the invalid that, by rushing after the region of lowest mortality for each season, he may defeat death. But too often this idea leads to almost as mad a dance as that of a moth around a candle!

Taking, then, as common-sense a view of the matter as so delusive a subject will allow, let us consider what combination of qualities will represent what Cuvier would have called the "conditions of existence" under which the majority of patients can be placed with regard to climatic and other surroundings to give them the greatest possible chance of successful medical treatment.

But first let it be clearly understood that I am now about to speak of those in whom disease is either imminent or present, or, having existed, has left such vestiges as constitute them more or less invalids.

Let him who, while yet young and in health, only fears the future inroads of some constitutional or hereditary taint, and whose temperament rebels against the trammels of a cautious life—let him, if he has no ties or responsibilities to prevent, take his life in his hands and his knapsack on his back, and go forth into this beautiful world of land and sea, mountain and river, valley, forest, and plain, to explore the grand battle-fields of nature, and run the risks which such explorations inevitably incur, for the sake of the great harvest which they sometimes bring—saying to himself, "Nothing was ever done without risk, and nothing great without danger, therefore I have taken my determination."

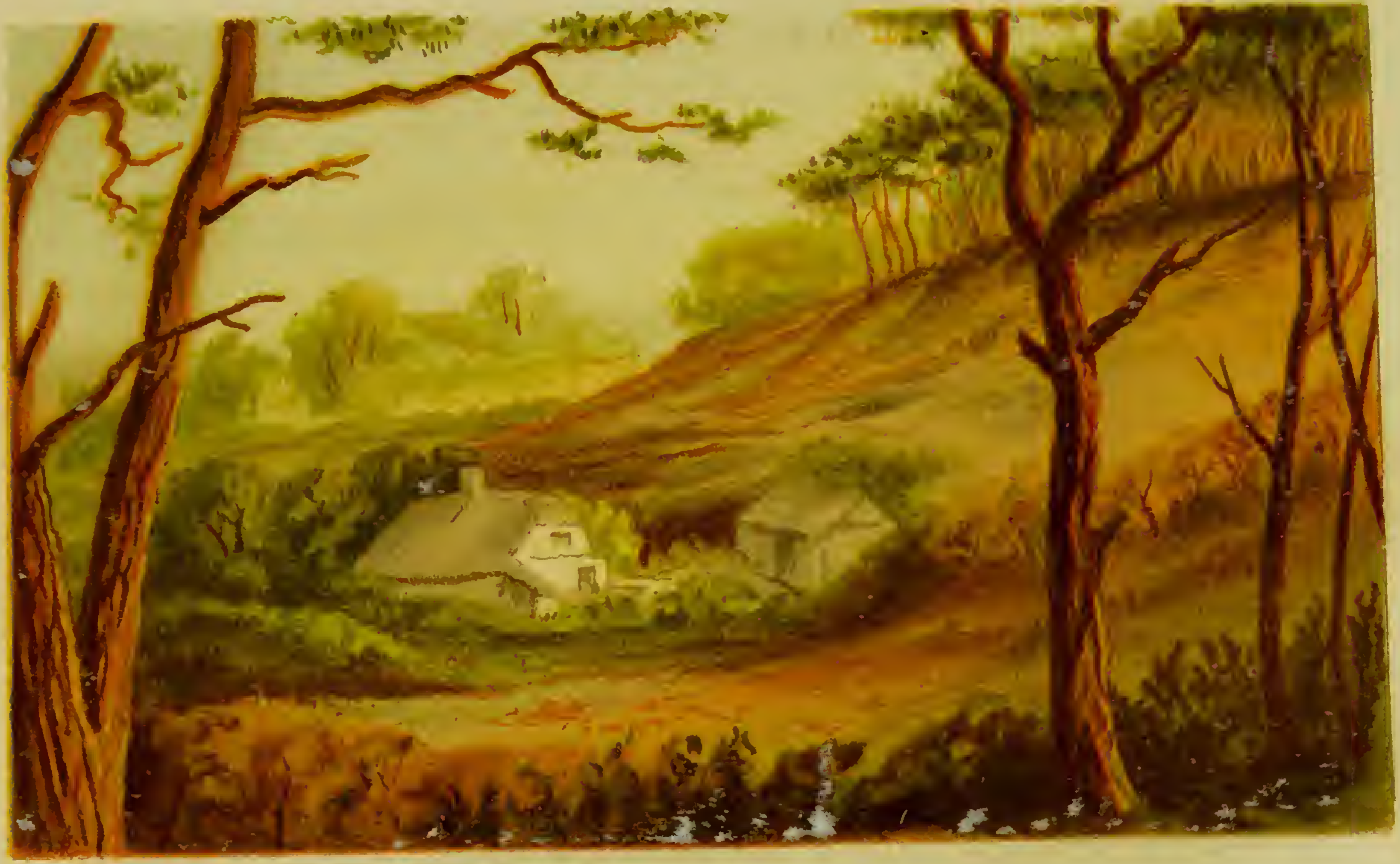
To shut up such spirits for months in Bournemouth, Davos, the Riviera, Arcachon, or any other health station in the world, is like attempting to keep swallows in a cage.

In the course of my career, many young men with a strong hereditary or constitutional tendency to consumption have thus left their native land, with my full consent; and many have returned in their prime to gladden their homes with the health and vigour they have thus secured.

But such careers are only for the few: and it is not of those that I am about to speak, but of the great majority.

The accidents of life often give us the opportunity of watching an *experimentum crucis* which we should not have felt justified in projecting; and several have occurred to me since I came to Bournemouth. Leaving London with the suddenness which I have already stated (see p. 3), there were many patients whose safety was believed by themselves or by their friends to depend upon their being within reach of me; some of them at once followed me to Bournemouth, and here took up their residence without consulting me as to whether it was best or not; and some of these have remained *through all the seasons* rather than go elsewhere and be away from me. Thus in such cases an *experimentum crucis* has been tried, which I might have hesitated to project, as to the climatic influences as "conditions of existence" during medical treatment; and in most cases, I am happy to say, the results have been satisfactory. For example :—

Case XIII. Miss ——, æt. 28, whom I had been attending, in consultation with her family doctor near London, was brought to Bournemouth, accompanied by her family, in October, 1882, a few days after I arrived—certainly not with any idea that she could do more than, with great good fortune, live through the winter; and at first this seemed scarcely probable. At the end of October, 1881, this patient was taken to the Riviera, where for a time she did fairly well, but in March, 1882, the nurse wrote, "Miss —— has not been going on at all well the last month. . . . She feels weaker



Summer on the Heaths round Bournemouth.—View from Hadden Hill, Holdenhurst Road, June, 1885.

Plate B. (*To face p.* 133.)

and more ill every day. She gets up for a few hours only now, and gets very tired even then. Temperature varies from 100° to 102° both night and morning . . . the night perspirations have been very bad, and after taking atropine, which Dr. —— has given her, she gets very feverish. . . . No sleep without a sedative. She has always a tendency to diarrhœa, and has a very poor appetite."

My advice was that, if her physicians in the Riviera thought it wise, I should send out a medical man to bring the patient home; upon which I received the following report from Dr. ——: "Mrs. —— has given me your letter to answer. She has written to Dr. —— to know how soon he can come out for Miss ——, and I was able to show your letter to Dr. —— before he left yesterday, and the following is our *joint* opinion. . . . We quite agree that Miss —— is losing strength, and that she will bear the journey probably *better now than later; she can gain nothing by stopping here*, except the chance of warmer weather than at home. The *left* lung is much in the same state as when she arrived (extensively excavated); there is *crepitation over the upper half of the right* lung, with very fair breathing in the lower half; the bowels are very irritable, almost constant diarrhœa; the expectoration has not augmented lately."

With great care she was brought home.

On the left side considerable erosion was going on in the walls of the cavities—which already involved nearly the whole of the lung—with copious expectoration. The patient was suffering from lithæmia, and it was principally by treating this state that, after several very critical weeks, a passive condition was restored. The right lung remained consolidated, but without excavation. The summer was occupied in endeavouring to maintain the passive condition in the lungs, and to recover some of the ground lost . . . and in the beginning of October she was brought to Bournemouth with great care, accompanied by the same doctor who travelled with her to and from the Riviera.

For some weeks she remained in a very precarious condition, seriously threatening a final "break-up." The temperature had again become high, with tendency to diarrhœa; the lung symptoms active; sputa crowded with tubercle bacilli and *débris* of air cells. The anti-lithæmic treatment which succeeded before, again restored a normal temperature; and, after several weeks, both general and local symptoms became passive, and she was able to go on steadily with restorative and antiseptic treatment and to benefit by the change of air.

October, 1884.—She has not been out of Bournemouth for a day since she came down, October, 1882, *not* by my wish, but, as I have said, from a dread on the part of her family of getting out of my reach. At the present time, the temperature is normal on an average, sometimes continuously so for weeks. No diarrhœa, no sweats, considerable expectoration from the left cavities, occasionally slightly tinged with blood, but no free hæmoptysis. There has been so little lung left on the left side for the last two years, that it is difficult to say to what extent the cavity enlarges, but respiration has improved in the parts not destroyed. The right lung has several times shown signs of activity, especially on one occasion during warm weather, when influenza was brought down from London by some visitors, and went through the house. At present it is quite passive, appetite and digestion are good, no diarrhœa, no sweats, some increase of flesh.

It must be noted that the patient has lived in the choicest part of Bournemouth, among the antiseptic emanations of the pines, at a moderate distance from the sea, and about 120 feet elevation, the hygienic conditions perfect. In the dwelling-rooms night and day the air has been kept impregnated with antiseptics, either kresoline, creosote, eucalyptus, pine oil, oil of cloves, or carbolate of iodine. Pancreatic emulsion and pancreatized foods have been taken daily without intermission, and cod liver oil from time to time. The other medicines have been arsenic, quinine, chloride of calcium, alkalies in a state of effervescence with citric acid and quinine when there were symptoms of lithæmia and a tendency to rise of temperature. Sedatives very seldom, and with much caution; counter-irritants from time to time. All treatment, whether medicinal, dietetic, or hygienic, has been carried out with most systematic and persistent care by devoted relations and an excellent nurse. Two years of life appear to have been already obtained by the above combination of climatic and other means.

We have had an almost tropical summer this year (1884) all over England, and although tempered by the sea breezes and the pines, the heat has been necessarily great, and on several occasions seriously tried the patient. There is no doubt that the cooler weather suits her best. January 1885, as these sheets go to press, she is particularly well, and goes out for drives on picked days.

Case XIV. Mr. ——, æt. 67. A distinguished London engineer. Always dyspeptic, overworked, and subject to rheumatic neuralgia, who consulted me occasionally for thirty years in London. He had become more and more subject to attacks of influenza, with acute inflammation of the nasopharyngeal mucous membrane, causing intense frontal-sinus-headache, and then descending into the bronchial tubes, with great prostration of strength, and leaving obstinate bronchial catarrh. In the winter of 1879, he was so long prostrated by an attack, that I advised him not again to winter in London—as his professional duties there exposed him much to the inevitable fogs and to morning and evening air in all weathers; but he recovered so well during the succeeding summer that he disregarded my advice. In the severe winter of 1880—indeed, in the very week of its utmost rigour—he had a worse attack even than before, from which he recovered with difficulty, and after which he was still more prostrated than before, and I made him promise that he would not again risk a London winter. The winters of 1881 and 1882 he spent at Cannes; and although the climate did not agree well with his dyspepsia, and he had some colds and bronchial attacks, they were not severe; and he got fairly well through the summer but without regaining strength. Finding that I had left London, he made several visits to Bournemouth, and thought it suited him sufficiently that he determined to try the winter of 1883 in the place—going up to London once or twice a week. He got on very well indeed; but during one of his visits to London he encountered a bad fog, and was detained the night of the fog in town. The result was one of his attacks of acute nasopharyngeal inflammation and intense headache, and extension of his complaint to the bronchi. He, however, made so good a recovery at Bournemouth, and the catarrh of the nasopharyngeal membrane (see Chapter VI.) cleared up so well under the climatic influences, that no vestiges remained, and he became so pleased with his experience of the place that he purchased an estate in the midst of the pine woods, where he determined to make his home for the rest of his life, and where he has been perfectly free from his old ailments, and able to go backwards and forwards to town up to the present time (January, 1885). His old dyspepsia and debility are decidedly mending, notwithstanding increasing age and continuance of his professional work in London.

Case XV. The following note is given in the patient's own words, in a letter to me after my arrival in Bournemouth. I saw him the other day (December, 1884), and he considered himself even better than he was two years ago:—

"Some years ago, when I was suffering from severe pulmonary hæmorrhage, you saw me, in consultation with my family doctor, in the neighbourhood of London. Acting under your advice I became much better, and at your suggestion I went to Australia, and remained there for some time. Not getting on so well there as I had done at first, I consulted Dr. Bird, a well-known physician at Melbourne, who gave it as his opinion that I was so ill that, although I might be able to reach The Cape, he hardly thought it safe for me to try to go so far as England. Happily for me, however, I did reach England, and I am now alive to write of the benefit I have derived from living at Bournemouth, to which place you sent me on my consulting you after my return from Australia, six years ago. Before coming here I used to feel languid and 'quite done for' by the middle of the day. Now this feeling of debility has ceased, and, although still conscious of the damage which my lungs sustained and of the need for continued caution, each year has brought an accession of renewed general health and strength. I am able to conduct a large amount of business, and to enjoy life as much as most people. I attribute all this to the beautiful climate of Bournemouth, as there is scarcely a day in the year when I am unable to go out. I may add that I know many others who have derived equal benefit from coming here, and I shall ever feel I owe you a debt of gratitude for having sent me to such a delightful place."

Case XVI. March, 1884. Mr. ——, æt. 34. Consulted me for slight hæmoptysis and several other ailments, which he attributed to having been away from Bournemouth on a visit. He soon recovered, and was out with the harriers, riding hard. The interest of his case is that he had been ordered by Dr. ——, of London, to go to Natal ten years ago, in consequence of frequent attacks of hæmoptysis and declining health; that he was prevented from going by some "accident of life" which brought him to Bournemouth; where he recovered his health so remarkably that he decided to take up his permanent residence in the place. He has lived here, summer and winter, ever since in good health; and he says that whenever he tries to live anywhere else he loses ground and gets a return of his complaints.

Case XVII. Master ——, æt. 14. April, 1884. A very pale, sunken-eyed, delicate-looking boy. The following is extracted from the note sent to me before seeing the patient:—

"Always described as having been a most delicate infant. Wet-nursed by an Alsatian, whose diet much deranged the child's digestive functions, and up to a few years ago he never had a natural motion, but this has much improved since he was ordered to take hypophosphites with his milk. Some throat ailment last October. In December, Dr. —— examined him, and said his 'chest was not strong.' February 1884, took a chill, the cold beginning in the head with sneezing. This soon settled on the chest and produced congestion of the lungs, the right side being the worst. The throat also ulcerated, and continued bad after his chest was better. He remains weak and very susceptible to take cold."

I found the vestiges of bronchial catarrh, with enlarged tonsils, and chronic post-nasal catarrh. (See Chapter VI.) From these he completely recovered under the combined influence of the Bournemouth climate and medical treatment, and his general health greatly improved. But as he was constitutionally disposed to become debilitated, I advised his removal to a mountainous air during the heat of summer.

By an accident of life this was rendered impossible; for his mother, who had old disease of the lumbar vertebræ, became suddenly paraplegic and could not leave her couch.

I ordered the lad to take riding lessons, and spend much of his time, while detained here in the hot weather, on horseback, and to take some sea-plunges occasionally. With this assistance he has stopped at Bournemouth from April, 1884, till January, 1885, without any return of catarrh, and has kept in excellent health ever since his first recovery from the vestiges of his former attack.

A sister of quite an opposite constitution, very full habited, florid, and stout, has also stopped through the summer and kept in radiant health; while the mother, although unable to take exercise and undergoing the trials of the menopause, has gone on well in all respects, gradually regaining power in the paralysed legs.

It is evident, therefore, that this test experiment in three very different cases in the same family, has shown the climatic "conditions of existence" at Bournemouth to be favourable to successful medical treatment. The place has suited the health of the whole family so well, that they have decided to reside here permanently.

Case XVIII. June 1, 1883. Mr. ——, æt. 28. Came to my house with the following note from Dr. ——, an eminent London physician, whose auscultatory skill I could not doubt:—"Decided changes in right apex and muco-crepitant râles in left base in limited area below heart apex."

His aspect was so strikingly bad that he seemed unfit to be out, or to be examined, and, before many minutes elapsed, he fainted, and on recovering from this, vomited. I found temperature 103°, pulse 100, very feeble, bowels confined; and on examining his chest, the right apex was found dull as described above, but the *left* lung was dull nearly from top to bottom, and scarcely any breath sounds could be heard, and it was only feebly moved in respiration. I learned from his wife that they had been in Bournemouth nearly a fortnight, and at first the patient seemed to be better than on arrival, so that they did not come to me; but the last few days he had been rapidly failing, with loss of appetite, and was sick after food, losing flesh, with cold feet and hot head and body with rigors, so that his condition was very different from that at the time he left his London physician, when the note for me was written. My opinion was that the state of the *left* lung was accidental—having collapsed with the fainting and exhaustion—and that the patient was in the first week of typhoid fever. I sent him home to bed, with a note to a local doctor, asking him to see him within a few hours, stating my opinion of what had happened and was likely to follow.

June 3rd. I saw him in consultation with the doctor, who found that my diagnosis had been quite correct, typhoid rash was coming out, and the *left* lung had expanded, was normal throughout, the *right* apex remaining as before. It was evident that he had brought typhoid poisoning from his home. The following peculiar confirmation of this was obtained by the inquiries of his London physician.

Mr. ——'s sister, living with him, had been married from his house before he left London, and the bridegroom had stayed there a week before marriage; both were laid up at a country hotel with typhoid—the wife having been attacked at the end of the first week of their honeymoon, and the husband in the second week. It was also found that one person had died of typhoid in a house near Mr. ——'s, and several others were ill with it in the same neighbourhood. The origin of his typhoid poisoning was thus complete. But the symptoms of illness connected with the right apex disease had dated from March. All April he had been getting more and more ill, and consulted the physician in London on May 2nd, at which time his cough was only of five days' duration, but many of his symptoms were like those of chronic drain-poisoning, although not supposed to be so at the time.

Mr. —— went through all the stages of a severe well-marked typhoid fever, the only complication being a severe pharyngeal thrush, similar to that which about that time was exciting much concern in the case of the late Right Hon. Mr. Fawcett. He was most carefully watched and managed both by Dr. —— and a skilled nurse, and made an excellent recovery. Our natural fears, that the lung disease would increase and develop under the stress of the typhoid poisoning and debility of convalescence, led to special care in this direction; but instead of getting worse they remained passive during the fever, and gradually cleared up during convalescence, so that I noted, July 20th, 1883, "Lungs as nearly normal as possible;" and we heard in December that he had continued well after returning to London. I ought to mention that his wife's maid, who had accompanied them to Bournemouth, had typhoid fever also, setting in a few days later than his, and she also recovered. His wife, who was *enceinte*, and assisted in the nursing, escaped.

This unpromising case, through an accident of life, afforded a most marked test experiment of the influence of the "conditions of existence" at Bournemouth upon the medical treatment of a most dangerous combination of diseases, due to septic and constitutional causes.

And especially must we note the advantages to a patient recovering from such an illness of being already surrounded by climatic conditions which allowed pure air and exercise to be obtained in the easiest and quickest way possible, without the fatigue and risk of travelling, and to be persisted in week after week during convalescence.

Case XIX. Mr. ——, æt. 68. Subject to severe winter cough, referred by him to the throat and chest; it had recurred four winters, getting worse each year. Having heard that I had several times been to Birmingham to visit a millionaire neighbour of his, he went to London to consult me. Finding I had left London, he followed me to Bournemouth. On examining him, I found that, except some emphysema, due to obstructed expiration, he had no lung disease, but severe laryngo-tracheal catarrh, due to the irritation of the dirty air of the furnaces and factories in the neighbourhood of which he lived. He was also suffering from lithæmia, which predisposed him to the affection of the mucous membrane. (See Chapter VI.) I advised him to stay at Bournemouth for the sake of the clean, pure air, and to take Vals water and tincture of podophyllin for his lithæmia. The effect of the improved climate and anti-lithæmic treatment was most rapid. All his laryngo-tracheal difficulties steadily cleared up, and he continued well through the winter (1883), instead of getting worse and worse as he had done at home.

This is only a specimen of numbers of analogous cases which rapidly improve on leaving the dirty, irritating air of cities for the pure and soothing air of Bournemouth, fully confirming the following remarks of the Registrar General:— "The breathing of dust, and of any mechanical substances, such as grit and particles of steel evolved in grinding or stone masons' work, is known to produce diseases of the air-tubes, called by various names; and it is thus exceedingly probable that the increase of deaths by bronchitis is due to the smoke, dust, dirt, and other matters in the air of towns and workshops, where more people every year are doomed to breathe. The practical inference is, that the most effectual means should be adopted to purge the air people breathe of all impurities; hence fires should be constructed to burn their smoke, streets should be kept clean, workshops should be well ventilated, etc." * (See Cases XXI., XXII.)

Case XX. Mrs. ——, æt. 26, in the autumn of 1883, came to Bournemouth for the sake of her husband, suffering from encroaching blindness, and obliged to retire from business on a small income; hence they took a cottage at low rent at Lower Parkstone. She had been for some time a confirmed epileptic and asthmatic, and was living on bromides, chloral and opiates. Parkstone was selected partly on her account, because they heard it was good for asthma. They had been there a month when I was consulted. Her husband wrote me that she had only once had an epileptic fit and an asthmatic fit *at the same time*, but she had constant convulsive twitchings, and was never entirely free from either asthma, epilepsy, or twitchings. "As soon as the asthma is almost subdued, [he wrote,] the remedies I am compelled to use to prevent the twitching symptoms lead to other symptoms, which end in a fit, then comes a return of the asthma and so on. She had pleurisy last winter, and one of the lungs gets congested during these attacks. She is still taking remedies ordered by Dr. —— and Dr. ——."

I found the patient in the truly deplorable condition indicated by her husband, and extremely cachectic besides. I asked her husband as to the possibility of a specific cause of his wife's ailments, and of his own blindness, but he could give me no definite answer. From his family doctor, however, I got a confirmation of my suspicion that Mrs. —'s cachexia, epilepsy, asthma, etc., were vestiges of constitutional poisoning in her pregnancy. Before marriage she had neither.

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* "Abstract of Statistics of Chest Disease, from the Registrar-General's Thirty-fifth Annual Report," in "Dr. Dobell's Reports on Diseases of the Chest." 1875.

Seeing that all the anti-asthmatic and anti-epileptic remedies previously prescribed had failed to give more than very temporary relief, and that she was definitely losing ground from the double influence of disease and injurious remedies, I advised them all to be discontinued, except gr. xx. of bromide of potassium, night and morning, to which I added gr. v. of iodide of potassium.

The cottage they were in at Lower Parkstone, when I was consulted, was low, damp, and overshadowed with deciduous trees—no sunshine could get to her rooms. Although suffering severely from bronchitis and asthma, and the weather wintry, I had her cautiously moved, in a warm, close-carriage, to healthy lodgings in Bournemouth, with manifest advantage and no harm. It was a marked instance of the importance of having varieties of climate close at hand, so that change of place could be made during illness and in bad weather.

As she needed watching, I placed her under Dr. ——, who followed up my treatment steadily; and he has informed me that Mrs. —— had no more fits after she got under the influence of the iodide, and that her asthma, although not absolutely gone, is no trouble to her, and she is free from catarrh. It is evident that the "conditions of existence" at Bournemouth were highly favourable to the success of the medical treatment.

Case XXI. Mr. ——, æt. 63, a distinguished Lancashire philanthropist, consulted me at Bournemouth, February, 1883, suffering from lithic acid diathesis of long duration, with marked rheumatic gout increasing upon him. But his most dangerous symptoms were those of threatening angina pectoris on slight exertion, aggravated by bronchitic attacks, which had been getting more and more frequent while residing in the large manufacturing town, in which all his pleasures and duties lay, and which he was, therefore, very loth to leave. His symptoms were definitely those of hardened coronary arteries. During the last five weeks he had had from four to five bad attacks, per day, of cardiac pains and distress, nearly amounting to angina pectoris, only relieved by nitrite of amyl and nitro-glycerine.

He was put upon anti-lithæmic and other treatment; ordered exercise at a slow pace on level ground when weather permitted, always to drive if there was the slightest hill. He greatly desired to get home, being aware of the uncertainty of his life, but the illness of some grandchildren who accompanied him detained him in Bournemouth, and he thus had the opportunity, by this accident of life, of testing the effect of the climate upon himself.

A month later, my note says: "All symptoms in abeyance." During March he had rigors from a severe chill, due to unwise exposure, but a prompt recourse to bed, diaphoretics and alkalies carried it off without any bad results, and no bronchial complications followed as had been usual at home. He remained several months quite free from cardiac spasm, and I used to see him wandering about the levellest roads and moorlands at a measured pace apparently well; and in May, his grandchildren having recovered, he determined to go home.

Let us now consider what have been the chief elements of the "conditions of existence" under which the medical treatment of these patients was successfully conducted.

(*a.*) An atmosphere pure and clean; free from the contaminations of a crowded population and of injurious manufactures, and in this sense aseptic.

The potency for evil of apparently minute uncleanness of atmosphere is graphically illustrated by Dr. Angus Smith in his important work on "Air and Water." (Op. cit.)

After showing the following variations in the percentage amount of oxygen in specimens of air taken in different localities—

An open heath in Scotland	20·999
Open places in London in summer	20·980
Court of Queen's Bench, Feb. 2, 1866 ...	20·650
The worst specimen yet examined in a mine	18·270

Dr. Smith goes on to say:—"Some people will probably enquire why we should give so much attention to such minute quantities—between 20·980 and 20·999—thinking these small differences can in no way affect us. A little more or less oxygen might not affect us, but supposing its place occupied by hurtful matter, we must not look on the amount as too small. Subtracting 0·980 from 0·999, we have a difference of 190 in a million. In a gallon of water there are 70,000 grains; let us put into it an impurity at the rate of 190 in 1,000,000: it amounts to 13·3 grains in a gallon. This amount would be considered enormous if it consisted of putrefying matter or any organic matter usually found in water. But we *drink* only a comparatively small quantity of water, and the whole 13 grains would not be swallowed in a day; whereas we *take into our lungs* from 1,000 to 2,000 gallons of air daily."

The plan so largely adopted, hitherto, in Bournemouth building-leases, of stipulating for a large space round every house, if persisted in as it ought to be, secures purity of air, even in spite of the rapid increase in the number of houses—keeping up the ancient idea of "Rus in urbe." (See Cases XIX., XXI., XXII.)

(*b*.) An atmosphere which is not only clean and pure in the negative sense, but which is positively disinfected and dezymotized by the oxydising and antiseptic influences of the peroxide of hydrogen and camphoraceous matters due to the chemical effects of moisture and sunshine upon the terebinthinate emanations from the pine trees. (See Chap. IV.)

(*c.*) An atmosphere which is neither irritating by over-dryness, nor relaxing by over-moisture; but moist enough to be soft; and what moisture is present being due to *sea breezes*, it carries with it the alterative, tonic, and invigorating properties of sea-water, while it supplies the element necessary for the elimination of peroxide of hydrogen from the turpentine of the pines, by which it is made disinfecting and antiseptic, as demonstrated by Mr. Kingzett. (See Chap. IV.)

Dr. Baréty says, "An excessively dry air is undesirable, since it produces a harsh state of skin, readily appreciable by the hand, and disturbs the general health in a way that varies in degree according to the impressionability of the individual. The forms which this disturbance takes are such as unwonted excitability of the nervous system, irritability, unusual sensitiveness, a vague sense of discomfort, sleeplessness and somctimes headache." (Op. cit., p. 36.)

The evil effects of an over-dry air upon the respiratory organs are painfully familiar to those who have had to watch severe laryngeal and bronchial complaints, and who know how necessary it is, while maintaining a proper temperature of the patient's rooms, to prevent the air from becoming over dry by diffusing steam through it—under the soothing influence of which the harsh stifling and irritating cough, which comes on as the air dries, is soon relieved.*

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* January, 1885. A striking practical demonstration of the effect of over-dryness of the air has just occurred as these sheets go to press. There has been a spell of excessively dry weather here this Christmas-tide, and accompanying it quite an epidemic of aggravated coughs, and consequent bad nights, among pulmonary invalids—resisting the usual means of relief. I suspected the cause to be the irritating effects of over-dry air, so I carried about with me an "August's hygrometer" as a rough and ready test. Laying it on the table of the patient's room while I made my examination, I found that even in that short time, in many cases, the index-hand went up from its standard "air of apartments," at which I set it, to the highest point of dryness which the instrument was capable of registering; and these were the cases in which the cough had been most obstinate and distressing. I at once ordered vaporisers to be set going until the latent humidity of the air should be brought back to

But over-dryness, is the only quality by which aseptic air can be safely obtained when not combined with antiseptics. It is only by a combination with such antiseptic and disinfecting properties as are afforded by the pine and eucalyptus that the beneficial effects of a moderate addition of moisture and an aseptic condition are rendered possible. (See par. *b.*)

(*d.*) An indispensable adjunct—an atmosphere in which dampness, properly understood, is impossible, in consequence of the extraordinary soil, and other circumstances pointed out in Chapter II.

(*e.*) An atmosphere moderately mild and fairly equable—due to the geographical position, the sea and land breezes, and the peculiarities of the coast—(See Plate I.)—and at the same time not subject to stagnation, but having a free circulation, both from heathland and sea, giving it a peculiar combination of refreshing characters. (See Plate IV.) "It need hardly be said that, in general, equable climates are more favourable to human life than those that are subject to great diurnal or annual fluctuations, and *in this respect the United Kingdom possesses rare advantages*, as we shall see when we come to deal with the subject of climate." (Scott, Op. cit., p. 45.) (See also Chap. IX. and Appendix.)

(*f.*) Comparative freedom from the causes of marine cachexia. (See Chap. III.).

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the standard "air of apartments," and to be kept at that point. This proceeding was accompanied by prompt and marked relief of cough, and consequently better nights. I should note that, when moisture is thus added to the air, oleum pini sylvestris and oleum eucalypti globuli, should always be vapourised with the water, so as to prevent any septic effects in the lungs. Increased cough is, of course, not always a sign of any increase or aggravation of disease. In fact, it is sometimes the contrary; but it is the one prominent and distressing symptom conspicuous to the patient and friends, to which importance is attached, and which depresses and fatigues the patient by day and destroys rest by night, thus materially interfering with the restorative processes; and for these reasons it must always be seriously considered by the physician.

(*g.*) Wide expanse and long duration of sunshine, with sufficient screen. (See List of Altitudes, p. 22; "The Pine Woods," Chap. IV. Also Plates I. and IV., and Appendix.)

(*h.*) Freedom from cold nights in winter, and from over hot nights in summer, from the influence of the sea and land breezes. While it is important to avoid cold nights, few things debilitate an invalid more than over-hot or close nights.* Thus Professor Flower says, in his "Notes of Experiences in Egypt":—

"Another characteristic of the Egyptian winter climate is that though the days are warm, even hot in the sun (usually about 70° or 75° in the shade), the nights are fresh and cold, and often accompanied by heavy dew, the thermometer frequently falling to 40° or below, though rarely quite to the freezing-point. To many constitutions this is advantageous. A sultry night following a hot day often induces languor and depression; but the freshness of the Egyptian night and early morning is invigorating and bracing, and enables one better to bear the fatigues and heat of the day." †

One of the reasons why proximity to the sea is almost a *sine quâ non* in obtaining the atmospheric conditions requisite for a health resort, is the impossibility of obtaining the equalising and refreshing influences of the land and sea breeze in any other way.

"The temperature of a country bordering upon the sea in the temperate zone is lowered in summer by the presence of the more slowly warming sea nearer it; in winter however, its temperature does not fall so low as it otherwise would, for the sea round it has stored up the warmth of summer. . . . . Countries lying far from the sea have, in contrast to this, great heat in summer and excessive cold in winter. . . . . Our climate in the British

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* See directions for the proper ventilation, etc., of sleeping-rooms, in the author's work "On Diet and Regimen in Sickness and Health," etc. 7th ed., p. 13.

† "British Medical Journal," 1874.

Isles is a decidedly maritime one. . . . . The temperature of the British Isles, surrounded by the sea, varies only 20° Fahrenheit on an average during the year; but that of the centre of the Continent, in the same latitude, changes to the extent of 70° Fahrenheit.* (pp. 132-3.)

And Mr. Scott says† :—"Land and sea breezes are the best known of the local circulations. . . . . The general phenomenon is, that about noon a breeze sets in from the sea towards the land, and dies away towards sunset. A little before midnight the land breeze commences to blow in the opposite direction, from the land towards the sea, and in its turn is succeeded by a calm about sunrise. The old explanation of this alternation was that it resembled the circulation generated by a furnace, etc. . . . . This theory is entirely disposed of by the circumstance pointed out two centuries ago by Dampier . . . . that the sea breeze begins in the offing, and extends gradually to the coast, while the land breeze comes from the shore, and forces its way out to sea. . . . Mr. Blanford has applied the principles of general atmospheric circulation to interpret the land and sea breeze alternation. His idea is that when the air over the land is expanded by heat, and raised more or less like a blister, the upper strata slide off towards the cooler sea, and produce an increment of pressure at some distance from the land (the 'offing' of Dampier). The air begins to flow from the region of increased pressure towards that where the air is rarefied and pressure is in defect, and so we have a *sea breeze* setting in from the offing, as Dampier so well described it, not a wind drawn in by suction, and working its way backwards, as would be the case if the particles nearest the heated spot moved first. At night the action is reversed, the atmosphere over the land is cooled by radiation and contracts; the isobaric surfaces slope towards the land, and the air above slides down from the sea, sinking over the land, and pushing its way out as the *land breeze.*" (pp. 285-287.)

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* Keith Johnston, Op. cit.

† Op. cit.

Hence we have the cold air of the land going out to sea, and the milder air of the sea taking its place *during the winter* nights, equalising the temperature and giving the atmosphere the important vivifying quality of marine freshness not obtainable by any other means.

(*i.*) Singular brightness and cheerfulness, due to the combination of circumstances just enumerated, and to the rapidity with which clouds are dissipated in consequence of the surrounding "rain-traps." (See Chap. II. and Plates I. and IV.)

(*k.*) Absence of fog. In the sense in which those accustomed to live in cities understand the word "fog," no such thing is known in Bournemouth.

"The effect of fog (in London) in producing an excessive mortality was very marked in the latter part of January and first fortnight in February, 1882, when a decrease in the mean temperature from 43·9° Fahr. to 36·2° Fahr., with occasional fogs, was followed by an increase in the death rate from 22·8 to 26·4 and 27·1. After four consecutive foggy days, with a low mean temperature (about 3·5° below the average), early in February the death-rates rose, for two weeks, to 35·3 and 29·3 per 1,000 inhabitants. This mortality was, however, much below that produced by the great fogs of January, 1880, when the low weekly mean temperatures 29·7° and 29·2° prevailed, and the death-rate reached the excessive sum of 48·1 per 1,000 for the week ending February 7th, and 35·5 for the week ending February 14th. During the last-named week, the mean temperature rose to 38·8° Fahr., and the fogs had disappeared; but their effects continued, although, no doubt, a considerable proportion of the deaths registered during this week had occurred during the preceding week. The deaths from inflammatory diseases of the lungs rose from 458 in the week ending January 24th to 688, 1,445 and 935 in the three succeeding weeks. These fogs alternated with sunshiny days, as, in spite of the fogs, 46 hours of sunshine were registered in the three weeks ending February 14th."*

I have not seen a fog since I left London more than two years ago. Even sea fogs are peculiarly rare. I have only seen one or two that reached the houses. This is due, in a great measure, to the important fact, I have before dilated upon (see "Marine Cachexia," Chap. III.), viz., that the houses are built on the cliffs, not under them. Hence all ordinary sea fogs spend themselves upon the faces of the cliffs, which act as bulwarks against the onslaught of the enemy; and it is only a sea fog that is sufficiently severe to reach at least 100 feet above the sea, or one accompanied by a sufficiently strong *south* or south-west wind to drive it up the bulwarks, and over their tops, that can reach the majority of the houses, and in the latter case it comes tempered by warmth.

But when we learn what is the meteorological cause of a sea-fog, we shall see how seldom a warm wind and a sea-fog can exist together, and hence how seldom a sea-fog can be driven inland from a south or south-west sea coast—that is to say, when, as I have observed, it has to be driven over a bulwark of cliffs more than one hundred feet high.

Sea-fogs, according to Mr. Scott, are thus produced: "The air over the sea is charged with moisture, and when *a cold wind blows over it*, fog is the result, which may be carried some little way inland, but cannot be produced over the surface of the ground on shore, because the air in contact therewith is drier." (Op. cit., p. 122.) It requires a *cold* wind—which is not a south wind. To get a sea-fog, therefore, blown over a south coast barrier of one hundred feet or more, first we require a *cold* wind to produce the fog, and then a *warm* south or south-west wind of sufficient strength to blow it over the south coast.

A sea-fog, however, so long as it is a *clean one*, has no very deleterious effects upon invalids, especially when it is diluted so as to avoid the over-stimulating effect on the respiratory passages of condensed marine vapours. It is a very different thing when it is *unclean*, when it is mingled with the smoke and dirt of a thickly populated town. This has been painfully demonstrated at Brighton of late years, where the masses of smoke from the crowded city have on several occasions, by mixing with a sea-fog, rivalled the worst London fogs in their abominable combination of evils.

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* "British Medical Journal," January 20, 1883.

Let all Bournemouth rise in arms against any speculators who may attempt to build smoking manufactories in their neighbourhood, or erect houses close enough together to produce masses of smoke !

At present we are eminently free from such nuisances, but a solemn warning is needed against future desecrations.

With regard to land-fogs, they are practically impossible with such a soil as I have described. (See Chap. II.)

To the residents in manufacturing towns and large cities (see Cases XIX., XXI., XXII.), where dirty fogs are unavoidable, and to country people who live on flat, moist lands (see Chap. III.), removal to a place like Bournemouth makes all the difference between death and life in the medical treatment of affections of the respiratory organs, and also in many other classes of disease.

(*l*.) Possibility of easily getting air and exercise, and of varying the scene.

However true it may be to speak of the grandeur of the sea-shore, and of the ceaseless changes of beauty in ocean skies, we must remember that the same poet who wrote :—

> " 'Tis true, O glorious sea ! I never weary
> Of thy great storms, nor of thy silver calm—
> To me thy boundless reach is never dreary,
> Its breadth hath something full of rest and balm."

also wrote :—

> " And have thy breakers, O thou mighty ocean !
> No other echoes save thy ceaseless moans ?—
> No other voices but the ceaseless motion
> Of waves upon eternal granite stones ?"

And again :—

"O foaming water, wilt thou *never* rest?
Is there *no* pause in thine impetuous race,
But fronting still despair, with angry breast,
And baring to the storm thy livid face?"*

And there can be no doubt that many invalids, lodged for months upon the coast, tire of the everlasting sea-view, and become seriously depressed by a want of variety of scenery in their walks or drives.

I have found it one of the great advantages of Bournemouth, that, while the sea is always near if wanted, there is, also, so great a variety of landscape that the invalid need never tire of either sea or land, but can change from one to the other at pleasure. A reference to the series of photographs of Bournemouth and its surroundings, to be obtained at the Victoria Library, a list of which I have given in my Preface, will beautifully demonstrate the truth of this statement to those who have not delighted in the scenes themselves. There could hardly be a richer field for the artist than is to be found here, and this variety of scenery is a most important aid in keeping up that cheerfulness of spirits in the invalid, which has so great an influence for good during illness and during convalescence.

Then, the quickness with which the soil dries after a shower, and the rapidity with which an overcast sky changes into brilliant sunshine; the many sheltered turnings in the roads, plantations, and pine woods, by which shelter may be found from wind, or draught, or sun, and the facility with which these may be reached, without fatigue, from almost every house, combine to give invalids innumerable opportunities of air and exercise that would otherwise be lost. (See Chaps. II. and IV.)

I have almost forgotten to mention another singularly cheerful characteristic of Bournemouth, which has particularly struck me, as a Londoner :—*the birds sing all the year*

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* "In the Watches of the Night."

round. I don't believe there has been a week since I came down two years ago—either in spring, summer, autumn, or winter—during which there have not been birds singing in the grounds round my house. To me it has appeared most remarkable, and I have heard it spoken of by invalids with both surprise and delight. The songs of birds, like the prattle and laughter of young children, break through the monotonous thoughts so apt to be fostered in a sick-room, and by their very incongruity rouse the patient's spirits even against his will.

In speaking of air and exercise, I wish to impress the importance of horse, pony, or donkey riding (in proper weather), according to the strength, etc., of the patients. There are special facilities for all of these at Bournemouth, and neither walking nor driving can compare with riding for consumptive invalids. It has even been regarded by very eminent authorities as a cure for incipient consumption.

But there is a view in which I wish especially to speak of the importance of increasing the practice of horse and pony riding in Bournemouth, viz., that consumptive patients sent to winter here are often accompanied by *relatives who have the same hereditary and constitutional tendencies as the patients themselves,* and who are frequently only one or two stages behind the so-called patient in the progress of the same family scourge. To these persons horse riding and pony riding would be the most potent aids to developing in their favour the curative influences of the climate.

For those who can hunt there are many opportunities within reach, as shown by the following hunting appointments, taken at random from this week's papers; and for those who cannot, there are unusually good horses kept at the riding schools.

But in addition to these facilities, I am endeavouring to induce the riding establishments here to introduce troops of sturdy and quiet ponies, trained for invalids to ride with safety. There happens to be a most excellent and interesting breed of ponies obtainable in the New Forest, said to be the descendants of those that swam to land during the wreck of the Spanish Armada.

HUNTING APPOINTMENTS.

From the *Observer and Chronicle*, Bournemouth, November 8, 1884.

"MR. F. RADCLYFFE'S HOUNDS.—Monday, Came; Thursday, Stag Lodge, Charboro. At 11.

"LORD PORTMAN'S HOUNDS.—Monday, the Down House; Wednesday, Thickthorn; Friday, Compton Abbas. At 11.

"THE CATTISTOCK HOUNDS.—To-day (Saturday), Mapperton; Tuesday, East Compton; Wednesday, Cerne; Friday, Traveller's Rest; Saturday, Wyniard's Gap. At 10.45.

"NEW FOREST HOUNDS.—Tuesday, Manor House; Thursday, Bratley Water; Saturday, Hythe Cross Roads. At 11.

"THE BLACKMOOR VALE HOUNDS.—Monday, Westhill Gate; Tuesday, Manor House, Purse Caundle; Thursday, Bishops Caundle; Saturday, Henstridge Ash. At 11.

"LORD WOLVERTON'S HARRIERS.—To-day (Saturday), Fontmell Village; Tuesday, Thornhill Farm, Okeford Fitzpaine; Thursday, the Kennels; Saturday, Cashmore Inn. At 11.

"The Weymouth Harriers, a new subscription pack, which has just been established, commenced their season last week by a meet at Radipole House. The pack comprises ten and a half couples, and will hunt the district between Lulworth and Weymouth. Mr. Walter Morris is the first Master."

(*m.*) Facility for slight changes of climate, without sacrificing the leading qualifications, and without the risks or fatigues of travel. (See Chap. IX.) This is a more important condition in a health station than may at first sight appear to the inexperienced.

There are phases in the course of many diseases in which such changes are essential to recovery, and these may occur at seasons of the year and in states of health in which removal to any distance is out of the question. I have already mentioned instances of this kind in relation to another part of my subject (Cases VIII. and XX.); but, if space permitted, I could give many more from my notes in past years of cases I have ordered to various health resorts; or from what I have seen since I came here. The most familiar and striking illustrations might be found in persons disposed to spasmodic asthma when suffering from other complaints. Thus I have seen such patients suffering from chronic bronchitis sent from some distant place for the benefit of this climate, and lodgings chosen which to the friends appeared singularly suitable. But the asthmatic tendency has been excited into activity, and the bronchial affection so aggravated thereby, that there was no possibility of dealing with it till the spasmodic affection was subdued—and this obstinately persisted till the patient was removed to a different part of the district, perhaps nearer the sea, perhaps further inland, perhaps more among the pines, perhaps more out of their way; perhaps higher up, perhaps lower down.

Any of these changes can be made within Bournemouth or its surroundings by a short drive. (See Cases in Chap. VII.)

So, again, in chest affections complicated with degenerated cardial walls,—of which I have seen a large number here, sent especially from the great manufacturing towns, where sedentary lives are passed in amassing fortunes amidst unhealthy surroundings.

Such patients often make great mistakes in selecting the site of their lodgings. Unconscious of the condition of their hearts, and thinking only of the luxury of warmth and shelter for their winter coughs, they select snug corners where they cannot move without going up hill, and where they are so "screened" and "protected" that they get no air fresh enough to brace their weak circulation. But they begin to mend at once if put on the more open plateaux, where the winds are fresh from the heathlands, and where they can stroll about without descending or ascending hills. (See Case XXI.)

And as I have pointed out, at pp. 5 and 6, phthisical patients may in the course of their treatment require several changes of climate—either in consequence of their disease changing for the worse, or *because it is advancing towards a radical cure*—and yet it may be quite impracticable to send them from place to place if this incurs long journeying in winter. (See Chapter IX.)

But here, we have not only all the varieties of climate to be found in Bournemouth proper, but there are in its immediate surroundings Boscombe, Southbourne, and Christchurch on the east, Westbourne, Branksome Park, and Lower and Upper Parkstone on the west; all varying to some extent in climatic peculiarities, and all easily reached by a carriage drive, short enough to be safe for a patient, even in the midst of severe illness. (See list of altitudes, p. 22, also Cases VIII., XX., XXVII., XXXIII., XL., XLI., and Chapter VII.)

(*n.*) Well constructed houses, well served. One of the first and most natural objections urged by invalids and their friends against change of climate is the fear of losing "the comforts of home"; and it is often difficult to persuade those who have had much experience of health resorts at home or abroad, or of country lodgings, that it is possible to find sufficient set-offs in the form of better air, change of scene, etc., to outweigh this justly dreaded loss of "the comforts of home." (See Chapter IX.) Thus Dr. T. King Chambers says:* "Do not send people across the Alps who cannot afford to spend upon comforts and luxuries somewhat *more than they are in the habit of spending at home*. . . . The misery of invalids who have to forego habitual indulgencies . . . quite outweighs the advantages of climate." (p. 95.)

After reviewing minutely the characteristics of the various climates, Dr. Charles Theodore Williams says: "It is above all things necessary to look to the temperament and digestive powers of the patient, and a spot to be suitable must be so, not only from its climate, but also from its *food supply* and surroundings, and it is in these particulars that so many otherwise healthy localities fail."

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* "Some Effects of the Climate of Italy."

No such difficulties or apprehensions need occur with regard to Bournemouth.

The hotels, boarding houses, and lodging houses are, almost without exception, excellently built and well arranged on purpose for invalids; they are not, as in so many places, awkwardly arranged private houses turned into lodging houses, without proper conveniences, etc., but have been built expressly for their present purpose. And for those whose establishments require it, and whose means can afford it, the practice here of wealthy families, possessing well appointed houses standing in beautiful grounds, letting them from time to time for the winter months, is an immense advantage; the homely surroundings quickly remove from the invalid's mind any idea of "being in lodgings."

With regard to food, it is hardly necessary to say that in a place like Bournemouth, seated in the midst of the luxuriant agricultural districts of Hampshire and Dorset, and with the sea and two salmon rivers close at hand, the food supply is as good as it is possible to desire.

(*o.*) The quality of the water—so essential a point in all modern hygienic considerations—is shown to be perfect by the analysis on the opposite page, made for me by Dr. C. Meymott Tidy, of water drawn from the main-tap in my own house.

(*p.*) The importance of first-rate medicaments, medical appliances, and medicinal foods cannot be overstated.

Only to-day a medical man, suffering from chronic renal disease, told me that this arose from an unfortunate accident. Having got chilled in the back while travelling, an acute attack of congestion of the kidneys set in on his arriving at a foreign health resort, and the active medical treatment which was necessary for the immediate relief of this condition, and which was promptly prescribed, was frustrated by the abominable quality of the drugs supplied, which rendered them impotent.

Asthmatic patients often recount the unnecessary sufferings

"RESULTS of the Analysis of a Sample of **WATER** received from Dr. Dobell, of Streate Place, Bournemouth, at the Laboratory of the London Hospital Medical College, Whitechapel, London, on the 28th day of October, 1884, and contained in Winchester Quart Bottles, duly labelled and secured.

(The results are stated in Grains per Imperial Gallon of 70,000 Grains, the Organic Carbon and Nitrogen being stated in parts per 100,000.)

Total solid matter.	Ammonia.	Nitrogen in Nitrates and Nitrites. = Nitric Acid.	Oxygen required to Oxidise the Organic Matter.	Organic Carbon.	Organic Nitrogen.	Lime (CaO).	Magnesia (MgO).	Sulphuric Anhydride (SO_3).	Chlorine = Common Salt.	Hardness.		
										Before Boiling.	After Boiling.	
Grns.	Grns.	Grains. = Grains.	Grains.	Part per 100,000		Grns.	Grns.	Grns.	Grains. = Grains.	Degr.	Degr.	
7·22	0·001	None.	0·016	0·060	0·024	1·12	0·432	1·455	1·944 = 3·186	1·91	1·91	Clear. *Free oxygen* 1·601 cubic inch per gallon. Reaction neutral.

"The constituents given in the enclosed table are probably combined as follows:—

	Grains per gallon.
Carbonate of lime	1·26
Sulphate of lime	1·02
Sulphate of magnesia	1·48
Chloride of sodium	3·18

	Grains per gallon.
Organic matter	0·12
Silica, alumina, etc.	0·16
Grains per gallon.	7·22

"C. MEYMOTT TIDY, M.B.,

"Professor of Chemistry and of Forensic Medicine and Public Health at the London Hospital, Medical Officer of Health for Islington, and late Deputy Medical Officer of Health and Public Analyst to the City of London, etc."

they have undergone through being seized with a paroxysm of asthma while at some country place, and, finding themselves run out of their usual remedy, they have been obliged to get some at the first drug-shop that could be found—and it has proved inert. The delicate vegetable anti-spasmodics used by asthmatics, require to be in the finest condition or they are useless.

Medicinal foods and appliances, which in modern medical practice constitute so important a part of treatment, ought to be easily obtainable by invalids, without loss of time; and, as they may require frequent changes, all varieties should be kept in stock by chemists, so that patients may neither have to wait while they are got from a distance, nor be obliged to have them in unnecessary quantities till they have discovered the form that suits them best.

For these, and many other reasons that will suggest themselves to medical men and patients, it is an essential condition of a health station that the chemists should be of the first class, and the place sufficiently populous to enable them to keep all the requirements of illness fresh and in proper variety.

Bournemouth is singularly well off in this respect. Before I left London, I sent the head partner of one of the chief wholesale drug firms to Bournemouth for his health; and I asked him to report to me privately on the different chemists there. I also submitted the names of the chemists to the leading London chemists for their private opinion of them. The result was that all agreed in reporting that, from Mr. Duncan, the senior chemist and druggist at Bournemouth, down to the last new comer, all were so exceptionally good that there was no need to recommend any one in particular. Much of the credit of this is undoubtedly due to Mr. Duncan, for having placed the standard of the mode in which a chemist's business should be conducted so high that no one who did not follow his example had any chance of success.

(*q.*) During my career as a London physician, I always knew Bournemouth as a place where patients would be certain to receive unusually good medical care from the local practitioners; and my two years' experience of residence here, and of more intimate communication with them, has confirmed me in this belief; and this, though I have placed it last, cannot be considered the least of "the conditions of existence essential to the successful treatment of disease."

By the time these pages have passed through the press, the conditions of existence essential to the successful treatment of disease at Bournemouth will be augmented by two institutions of immense importance.

(1.) A Sanitary Hospital is in course of erection, so arranged, as to distance from the dwelling-houses and as to the premises themselves, that complete isolation of contagious and infectious diseases can be secured, should they at any time be introduced into the town. And the institution will be provided with disinfecting furnaces and other sanitary apparatus, and with proper ambulances for the transit of patients.

(2.) The Mont Dore, "for the treatment of the rheumatic, gouty, scrofulous, syphilitic, tuberculous, dartrous, and other morbid constitutional states; also for asthma, consumption, bronchitis, emphysema, naso-pulmonary catarrh, and other affections of the throat, chest, and mucous membranes."

When I wrote from London to the medical men at Bournemouth, saying, in August, 1880, "I propose to establish at Bournemouth an essentially similar system of treatment to that known in Auvergne under the name of the 'Mont Dore Cure,'" and submitted to them my reasons for thinking that the "treatment might be carried out at Bournemouth even more successfully than at Mont Dore, Auvergne;" when, in 1881, in my book "On the Mont Dore Cure, and the proper way to use it," I said—still writing from London—"As it is the object of this work, for the public good, to place important remedial powers possessed by medical men abroad in the hands of those at home, I dedicate my pages to both, as a slight token of personal regard and of confidence in their good fellowship and public spirit;" and when again I said in the beginning of my book: "As I alone am responsible for introducing the so-called Mont Dore cure into this country, I feel that I am bound to accept the additional responsibility of teaching the proper way to use it, and of seeing that it is rightly carried out," I hardly hoped to have had the pleasure of seeing, so soon as 1885, the completion in Bournemouth of a palatial institution under the direction of a public company established for the purpose of carrying out my suggestions.

But the distinguished chairman of the company, Dr. Alfred Meadows, J.P., has informed me that "The Mont Dore" will shortly be opened for patients; and also that, following up a suggestion which I have long pressed upon the directors, he has been himself to Auvergne and made arrangements with Dr. Emond, the chief physician to the Mont Dore establishment there, to come and reside at the Mont Dore in Bournemouth during the winter season—when the Auvergne is always closed through bad weather—and superintend the carrying out of the Mont Dore treatment here in exact accordance with the method so successfully adopted in France. I consider this of the utmost importance to the full realisation of my proposed plans.

It will not in any way interfere with the attendance on the patients residing in the Mont Dore of any of the medical practitioners of the town whom they may select; but Dr. Emond's presence on the spot will secure that, when the special Mont Dore treatment is prescribed it will be carried out in the most perfect manner. And, as I said in my first letter to the medical profession, and afterwards in my book, p. 178: "It must never be forgotten that it is a very definite and potent course of emphatically medical treatment, and will require the same skill and judgment on the part of the medical advisers at Bournemouth as is exercised at Mont Dore in the Auvergne, otherwise it will not have the same success."

As a supplement to what I had already written, and after further consideration of the subject, I wrote to the directors in January, 1882, as follows :—

" The next time you place before the medical profession the prospectus of your company, I think you would do well to remind them of the following well-known important facts, to show how the 'Mont Dore" may prove of inexpressible advantage in the medical treatment of some of the most common, most distressing, and most intractable combinations of disease with which we have to deal in practice.

" 1. In certain stages of diseases of respiratory organs, and in diseases of the heart and blood-vessels, secondary diseases of the urinary organs and dropsies are not only common, but almost inevitable, under present circumstances.

" 2. These urinary and dropsical complications are among the most serious items in the tendency to death from diseases of the respiratory and circulatory systems.

" 3. Again,—in certain stages of diseases of the urinary organs and in dropsies, diseases of the respiratory and circulatory organs are not only common, but almost inevitable complications, under present circumstances, and are among the most serious items in the tendency to death from diseases of the urinary organs.

" 4. The inter-dependence between the functions—of the skin, of the urinary mucous tract, of the respiratory mucous tract, and of the vascular system—are well known to be so intimate, that each can be influenced in an important manner by acting upon either.

" 5. The greatest difficulty to be contended with, in successfully managing the above-named complications, consists in the impossibility, under ordinary circumstances, of combining under one course of treatment the remedies necessary for *acting coetaneously* upon all or several of the diseased systems.

" 6. There can be no doubt that, quite irrespective of the curative powers of the arsenical waters, the system of treatment *to be carried out under one roof* at the Mont Dore of Bournemouth, combining as it does, under singularly favourable conditions, the most potent and approved means of acting —(*a*) upon the skin, (*b*) upon the respiratory mucous membrane, (*c*) upon the urinary mucous tract, (*d*) upon the alimentary mucous membrane, (*e*) upon the circulatory system,—places at the command of the medical profession a more complete combination of the resources of enlightened modern medical treatment than has ever before been brought within their reach.

" 7. The treatment of the above-mentioned large class of distressing and intractable combinations of disease will be among the most important functions of the Mont Dore establishment; and I feel sure that, if judiciously carried out, exceptional success must result from a system of management so remarkably appropriate to the important objects in view."

In answer to the very natural question, " How can such simple means obtain such remarkable results? How can the same remedy cure so many diseases?" I pointed out that the long list of diseases stated (by the most eminent physicians practising in the Auvergne from 1768 to the present day) to be suitable for the Mont Dore Cure, can readily be assembled under a few general headings, according to their constitutional or local causes and inherent natures; and these classes of disease are such as we know to be amenable to treatment by the very means adopted at Mont Dore. And when we ask ourselves why the Mont Dore Cure should obtain better results than we have been able to obtain under ordinary conditions by similar means, the answer is simple enough to any physician of large experience in such matters, viz., that, under ordinary circumstances of medical treatment, we scarcely ever have it in our power (*a*) to put a sufficient number of our most potent means of treatment into force at once; (*b*) to combine them in a systematic manner; (*c*) to secure that they are effectively carried out during a sufficient period of time; and, (*d*) this is especially the case with such remedies as we have been discussing; whereas all the required conditions are secured at Mont Dore; and hence the grand difference in the results.

Finally, I wish to repeat here what I said when I first introduced the subject of the Mont Dore treatment to the profession: "That, in accordance with my invariable rule, in reference to *all remedies and means of medical treatment*, nothing will induce me to have any *pecuniary interest* in the commercial part of the above plans." Therefore I have nothing to do with the financial affairs of the "Mont Dore Company." But as a *medical institution* founded at my suggestion, I must always take a warm interest in its proper management.*

The following cases may supplement those already given in illustrating the effects of the several conditions of existence enumerated in this chapter.

Case XXII. March, 1884. Mr. ——, æt. 54. Came from Lancashire, suffering from "loss of weight, blood-spitting and lung disease," apparently due to the combined influence of cotton dust, to which he had long been subject in his business as a "cotton waste dealer," and frequent colds caught in transit between his office and mills across a damp and cold yard. No chest disease in the family. For ten months, every few days, spits about two drachms of blood mixed in an ounce of muco-purulent dirty phlegm, weighs 9 lbs. below average, is very feeble, and looks quite ten years above his real age. A large patch of emphysematous lung in the left cardiac region, defective resonance over the roots of both lungs. Right upper half dull front and back, with creaking, cavernous sounds and dryish rhonchi; left upper lobe deficient in resonance, breath sounds dry and harsh. Sputa examined microscopically for cotton fibres, but none found. No bacilli, no *débris* of air-cells. Ordered to use a spray containing, at first, biborate of soda and glycerine, and, afterwards, alum ; to vaporise antiseptics in his bedroom; to take pancreatised foods and good diet; and to live in the fresh air as much as possible. He took great delight in the purity and freshness of the air of Bournemouth as compared with what he was accustomed to in his Lancashire city. The hæmoptysis was very obstinate, but gradually subsided, the sputa diminished, cough left except in the evening, his strength improved, so that he took very long walks, and he ceased to lose weight notwithstanding his greatly increased exercise. After remaining under treatment from March to May, he went home to his business in good spirits, all his symptoms in abeyance and the physical signs passive: whereas, when he arrived, he was rapidly going to the bad. I have no doubt that he ought to have stayed much longer to substantiate his improvement, but his business calls pressed him to return.

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* For full details of the treatment in France and England, see the author's work "On the Mont Dore Cure, and the Proper Way to Use it."

Case XXIII. January, 1884. Mr. ——, æt. 28. Sent to me from Yorkshire by Dr. —— and Dr. ——, by whom he had been with great difficulty and skill got through an attack of pleuro-pneumonia with effusion on the right side when in a very unsatisfactory degenerated state of health, resulting from his having suddenly come into property and been living very carelessly. His doctor wrote, "On May 18th, dyspnœa being very urgent, and no absorption taking place from medicines, we determined to aspirate, and drew off 2½ pints. This had to be repeated May 26th and June 15th. He was in such an exceedingly low state that for the whole day afterwards he fainted if moved in the most careful manner from one side to the other. It seemed for a long time as though it would be impossible for him to rally. He developed a gouty state . . . . the bronchial tubes were very irritable . . . . we feared degenerative changes . . . . It was a very difficult case to manage, owing to the tendency to relapse, due to the state of constitution produced by his previous habits . . . . He was *seven months in bed,* and did not get out of his room, in consequence of bad weather in the north, till he was sent to Bournemouth."

When I saw him in January, he had settled with his wife and children in a pleasant house high up on the East Cliff (see Altitudes, p. 22), where he had been some days, and had so far improved that he was able to get out a little. His aspect was suetty, bloodless, feeble. He was short-breathed, had some œdema of the legs; urine was abundant, free from albumen; bowels regular, no expectoration. The right side of the chest was flattened, but measured only 1 inch in circumference less than left, dull from end to end except the apex above the clavicle and above the scapula, where respiration was fairly normal and supplementary, vocal fremitus almost *nil* in lower parts, *plus* in upper. Some faint and distant respiratory sounds audible. Left side quite normal.

The Bournemouth air suited him exactly. I insisted on regular habits, and out-of-door exercise on all suitable days, with gymnastics for the right side, restorative medicines and hepatic stimulants.

He had no relapse or drawback, and went home in May in renovated health, and with a marked improvement in respiratory powers on the affected side, notwithstanding the severity of the illness and the previous state of deteriorated health. It seems almost certain that, had he been under the same *favourable conditions of existence during his illness as he found here,* it would not have been necessary to confine him to bed seven months, and to the house from April 1883 to January 1884. Recovery would have been more rapid and more safe if the climatic conditions had allowed of more air and exercise.

His wife and children stayed with him at Bournemouth. The children were much benefited by the change, and his wife, who had a young baby, and was exhausted by nursing and anxiety when she came, went home quite well.

Case XXIV. Miss ——, æt. 14, was brought from the Midlands, to consult me in London, in June, 1882, when I noted:—"Excavation back and front of right upper lobe, especially towards the sternum. Early but advancing consolidation of left apex. Menstruated two years ago; now stopped for several months. Exceedingly feeble, losing flesh. Illness said to date from a cold last March." She was placed under pancreatised and other restorative foods, chloride of calcium, arsenic, quinine, and counter-irritants and antiseptic inhalants. She went with friends to Southsea, from which she returned, decidedly improved in both general and physical signs, at the end of July; but my note says, "physical signs are still very marked, and pulse is still 120." When I left London, at the end of September, 1882, she followed me to Bournemouth, and was placed to board with a lady in a very suitable house in the midst of the pines, in the best part of Boscombe, the same plan of treatment being steadily pursued. Both general and local symptoms steadily improved, and in January, 1883, menstruation returned. February—"Still a large-sized cluck with both expiration and inspiration in right apex, resonance improved, no cough, no expectoration." April 18th: She came for last examination before going home. "Chest sounds nearly normal. No cluck, but slight dulness and harsh breathing in right side; left normal."

May, 1883.—Her family doctor wrote:—"Miss ——, who since her return home has continued fairly well, is now suffering from an inflammatory glandular swelling, extending along the submaxillary region. It is painful, and the indications are clearly towards suppuration. . . . I shall be glad to have any suggestions on the case." We put her again upon chloride of calcium and quinine. I heard that this suppuration discharged freely, and gradually healed, after which her health went on fairly well, and she had no return of cough. She was sent down to Bournemouth again to see me, February, 1884, in consequence of amenorrhœa — menstruation having ceased since the suppuration of the gland. She had grown considerably, was definitely anæmic, she regained colour and health, and went home in March; chest sounds nearly normal, no cough; she became regular, and her health seemed established. In the autumn of 1884, her family were so satisfied with the good effects of the climate, that they came with her to reside at Bournemouth; she is perfectly well and takes long walks without overfatigue.

Under the favourable "conditions of existence" at Bournemouth, medical treatment was signally successful in saving the patient from a phthisical death, which at first seemed imminent, and in establishing good health.

Case XXV. Miss ——, æt. 19. Her friends wrote, January, 1884, from Kent:—"She suffers from asthma and bronchitis. Sir W. Jenner recommends Bournemouth for the winter. He thinks a winter there might cure her, as the lungs are sound at present. The great thing is to get away from the horrid fogs." A seven-month child, always delicate, but not asthmatic till after whooping-cough, at Hastings, seven years ago. Began with severe recurrent bronchial catarrh, to which her mother, who is gouty, is also subject; father, dead, was subject to rheumatic fever. The asthmatic attacks usually occur at a post-menstrual period, when she generally "catches cold," and has neuralgia in the face and head. She did not arrive till the end of January, having been detained ten days in bed with asthma and catarrh. The weather in Kent was very bad, and as the attack did not clear off, she was carefully brought to Bournemouth, and placed in a well-situated house among the pines at Boscombe. I found "heart and lungs normal, except catarrh and the remains of asthmatic wheeze. Bowels habitually constipated, liver congested, skin tinged with bile pigment, urine loaded with lithates and purpurates." I gave her podophyllin and aloes in tincture every night, Bourboule water for drink, and citrate of caffeine for the neurotic symptoms, if required, clearing up her catarrh with lobelia and serpentaria. A few days' treatment was sufficient; for the asthma cleared up immediately with the change of air, the secretions were set free by the medicines, and the catarrh was gone in a week. I then ordered horse exercise, of which she was very fond, every fine day; to keep away from the beach, as she was lodging within sound of the sea. She regained health quickly, had no more catarrh or neuralgia, notwithstanding a severe chill and shivering fit in a cold church, and went home at the end of April, not having required any further treatment after the first week except the podophyllin and aloes and Bourboule water. November, 1884. She was sent down again under similar circumstances to those of the last attack, and rapidly recovered as before. January, 1885. She is still here, perfectly well; and a younger sister (æt. 17) who accompanied her, having just returned from school, suffering from facial and ocular neuralgia, and so anæmic and debilitated by over-growth, etc., that she fainted during her first visit to my house, has made a steady and rapid recovery. Both sisters have been able thoroughly to enjoy Christmas dances and other amusements.

Case XXVI. May, 1883. Dr. —— sent a patient to me with this note: "Mr. —— is a well-known, eminent and most active mining engineer; his case is a very interesting one. . . . He has been residing with me at Bournemouth three months. At his own place in South Wales he had been burning 'Himrod' (the only thing that relieved his asthma) fourteen times in twenty-four hours. He came to my house on his knees at the bottom of the railway carriage, nearly all the way from Wales, to get breath. After he had been with me three days, his asthma left him, and he hardly ever needed the 'Himrod' again. Finding himself so well, he left me for his home in April; but the symptoms returned and continued with unabated severity, and he came back here yesterday." The patient rapidly recovered, as before, and after a time urgent professional duties called him home, but with the former result. His general condition was one of fatty degeneration, and his heart specially weak. His liver always disposed to congestion, and his diathesis lithæmic. These matters were always carefully treated when at Bournemouth, with manifest benefit to his general condition, and he was able to live much out of doors.

In April, 1884, I was asked to see him with a very serious attack of capillary bronchitis, which put his weak heart to much distress; but even this did not develop any serious asthma, and he recovered from it well. He has again and again tried to resume his residence at home, but it is of no use. He is only well at Bournemouth, to which he finally returned in November, 1884, after nearly losing his life at home, where he had been too ill to be moved. January 1885, he remains at Bournemouth, quite free from asthma, and his general health nearly restored.

Case XXVII. In January, 1883, Dr. —— sent Miss ——, æt. 47, to Bournemouth, not with much hope—he wrote—that any climate would suit the case, but "for the advantage of having you on the spot"; the fact being that, whereas the patient was perfectly free from asthma in London, she was steadily losing health for want of change. She suffered from inveterate spasmodic asthma in every place except London. Place after place had been tried in vain, the asthma had always seized her after twenty-four hours, and never yielded till she was with difficulty got back to London. On the last occasion the spasm was so severe, protracted, and obstinate, that she had to be accompanied by a doctor, in an invalid carriage, giving her chloroform from time to time on the journey. It was hardly expected, therefore, that Bournemouth would be more fortunate than other places, but reliance was placed upon my being "able to master the storm, somehow."

She arrived one evening, and next day I was asked to see her, as her usual prodomata of an attack had been gathering during the night, and she was fast getting into one of her usual paroxysms. Her constitutional state was most unsatisfactory; my note says: "Skin deeply tinged with biliverdin, cholesterine, etc., but no bile, exceedingly thin and haggard, highly neurotic; urine free from sugar, bile, or albumen. No lung disintegration; menstruation has ceased, but climacteric flushes and hyperneurosis are bad, and bowels torpid." Dr. ——'s letter on the case says: "Miss ——'s health, always feeble, has been *wretched* since the change of life, and her most urgent symptoms have been connected with this. Nervine remedies suit her best. Strong tonics, wine, etc., disturb her head." Her circulation was miserable, and her asthma was coming on with a steadily increasing rush. I determined to try and crush the nerve storm at once by full and repeated doses of stramonium with ipecacuanha, nitrate of potass, and spirit of nitrous ether and a brisk purge. This succeeded so well that she ate some dinner that evening, and had a night free from asthma; but I found that this took place only under the effect of the medicine, any relaxation of which was followed by an encroachment of the enemy. Now came the question of local influences. (See p. 159.) She had chosen lodgings not far from the sea, at an elevation of only 44 feet, and was so charmed with them that she did not at first like to move as I wished her to do, to a doctor's house, at an altitude of 130 feet, where she would be further from the sea, and with a doctor on the spot night and day. However, the asthma, although kept in abeyance by the medicines, still smouldered, and in a few days she wrote: "We find we have made a mistake. I have had two bad nights, and we shall settle ourselves at —— this afternoon." The move was successful. The anti-asthmatic remedies were able to be gradually withdrawn, and constitutional treatment was put in force in their place, with the effect that Miss —— remained at Bournemouth all the winter and spring, improving in health, and with no serious asthmatic complication. She visited London in the summer as usual without asthma, but was not so well in health as at Bournemouth, and she returned to spend the autumn and winter. A slight threatening of asthma came on when she first returned from London, but was easily controlled, and she has gone on well since. January, 1885: She continues to do well.

Case XXVIII. March, 1883. Mr. ——, æt. 45, a London bank manager, consulted me at Bournemouth under circumstances of great distress to himself and family. He had been examined by the medical examiner to the bank, who had certified to his directors that he had "disease of the right lung, which so incapacitated him for the performance of his duties in London that he must have six months' change immediately, and not return to his London office again."

This opinion was submitted to me by the medical man who wrote it, for confirmation or otherwise, and I was to prescribe the necessary change of climate.

I found: "Emphysema slight generally, but specially marked in the upper lobes in front. Asthmatic complication of severe bronchial catarrh, no destructive lung disease." Four years ago he had pleurisy in the right side from cold, but was well in a week. Last December caught cold at a funeral, and had an attack which evidently was bronchial asthma. From this he had never recovered, and was sufficiently invalided that, although partly performing his duties, he had not been able to get out of the bank, which was in a dense part of London, day or night.

I wrote my opinion to the medical examiner of the bank, and strongly urged that the certificate of his incompetence should be withheld for the present, allowing him to stop at Bournemouth for a short time, to put my diagnosis and treatment to the test.

The climate suited the asthmatic complication, and this made a sudden improvement in his symptoms, and with the pure, clear, balsamic air, and some medical treatment, he rapidly recovered, no disease remaining but the emphysema.

I advised his directors to continue his duties at the bank, but to arrange that he should leave his office in good time of an evening, and live out of London. This was agreed to, and answered perfectly, thus saving the man and his family from ruin.

Case XXIX. Master ——, æt. 3. December, 1883.

Delicate pink and white fragile child; bronchial catarrh widely spread, but especially marked above. Left upper, back and front, less resonant than right; poor resonance on both sides above; lower parts rather hyper-resonant, and breathing there loud and harsh, whereas above it is choked. This state had been left as vestiges of a severe catarrhal attack, and there was an asthmatic history on both sides, which was definitely complicating the child's bronchial symptoms. The family doctor sent with the child the following note.

"There is dry breathing all through the bronchial tubes, particularly at the back of the chest and the minute tubes at the base of the lungs. Over the anterior chest, the sounds are tubular, although there is considerable power in the normal sounds of respiration. No secretion. The heart is slightly laboured, this being perhaps due to the occasional difficulty of breathing. The liver is apt to get out of sorts, and requires attention."

I advised that the child should make a long residence at Bournemouth, and a satisfactory house was taken in Branksome Park, on high ground, amidst the pines. I prescribed counter-irritants to the chest, etherial tincture of lobelia, Parrish's syrup of phosphates, some podophyllin drops for the liver; daily exercise, especially pony-riding, when weather permitted; and I placed him under the careful watching of an excellent local family doctor.

Everything went well; the lobelia relieved the asthmatic tendency, and the bronchial complaint cleared up; the loss of resonance remained at the upper part of the left lung for some time, but steadily diminished. I had seen very little of the patient, although hearing of his good progress, when, in March, the doctor wrote: "I should be very glad if you would see Mrs. ——'s little boy with me this afternoon as soon as possible. He is in a very critical condition. Serious illness only came on in the night."

I found temperature 103°, and the child just beginning to perspire from antimony and steaming, which had been prescribed, but he was respiring at an almost uncountable rate, and still looked cyanotic, although the doctor said less so than a short time before. He had intense congestion of the nasopulmonary mucous tract, but no consolidation; and as the effort of respiration was chiefly in expiration, with no attempt at forced inspiration being made, I considered that the ominous appearance was chiefly due to neurotic causes, and gave a favourable prognosis, prescribing ℳ v. of Tinct. hyoscyami at short intervals, till urgent breathing ceased.

The doctor wrote me: "Mrs. ——'s little boy got rapidly better after you saw him, and in the evening all distress of breathing had disappeared. He has made a good recovery with no undue amount of expectoration. Thank you very much for your kind and speedy help."

From that time, March, 1884, to December, 1884, the child continued quite free from attacks, and in good health; when he had an exactly similar, although less severe attack, which yielded to the same treatment as the former one, in an equally marked manner.

This case is a most satisfactory instance of the good influence of the "conditions of existence" at Bournemouth, for the medical treatment of asthmatic bronchial catarrh in delicate children. Many others, equally demonstrative, have occurred during the last two years, for which I have not space. I have selected this one, because of its relation to the very different case of the child's father. (Case V., p. 60.)

Case XXX. February, 1884. Master ——, æt. 15, of King's County, Ireland, was brought to consult me at

Bournemouth, in a very unsatisfactory state. His father said that he went to school in Surrey, a fine, healthy boy. His only illnesses had been rheumatism in the right hip, without fever, February, 1883, and measles, May, 1883, from both of which he perfectly recovered. Cold and sore throat five weeks before going to school, from which he had also recovered before leaving home. He returned from Surrey, December, 1883, having "had a cold three days," but, his father said, "he was a very different boy than when he left for school; had lost flesh and strength, and was low in condition altogether, in addition to which he had a bad cough, but no expectoration till the last week in January." I found the upper fourth of the left lung dull back and front, and the upper fifth of the right defective in resonance in front; resonant behind. Crepitation small and large, scattered widely throughout both sides of the chest, especially marked in the dull portion of the left. Counter-irritants, expectorants, tonics, and inhalations of carbolate of iodine were used, and, as he was losing weight, although eating fairly, pancreatic emulsion was given. He was ordered to remain in Bournemouth till better. The place he came from was damp and cold.

After 39 days at Bournemouth my note says, "All morbid physical signs gone, except some want of full resonance in the places previously dull. Has gained four pounds. General health and strength so good that his friends wish him to go back to school as they are obliged to return to Ireland." By my advice, however, his name was taken off the school books, as I thought he ought to spend the next winter in a warmer place and with better supervision. He went home with his parents, and, November, 1884, his father informed me that he had gone on perfectly well, no relapse of any kind occurring. "He considered the effects of Bournemouth air were very marked, but that the pancreatic emulsion, which he continued after leaving, had a wonderful effect in pulling up his flesh." I think this boy's lungs were saved from the disintegration which was imminent when he came to Bournemouth, by the "favourable conditions of existence" under which his medical treatment was conducted.

Case XXXI. October, 1882. Soon after I arrived in Bournemouth, Miss ——, an exceedingly fragile girl, æt. 24, weighing only 6 st. 9 lb., was brought to consult me. Her home was in Birmingham, but she was unable to live there, always getting worse on returning, and recovering on coming to Bournemouth, where she had already been, off and on, for two years. Two years ago on arriving she weighed 6 st. 9 lb., and on leaving 7 st. 3 lb. Now she had just been home, lost weight, and got worse, as usual, night-sweats and diarrhœa having returned, as well as loss of strength, increased cough, and fever, with streaks of blood in the sputa. There was extensive dulness of both upper lobes, large squashing cavity on the left side, deep disintegration on the right; dulness on left side, below the scapula, from former pleurisy. She was treated with cod oil, when she could take it, pancreatic emulsion, pancreatised foods, tonics, and antiseptic inhalations, carefully regulated air, exercise, etc.; and in a month her signs and symptoms had become passive, weight increased 2 lb.

I have seen this patient from time to time. She has been home and to Malvern for change in summer, but is never so well as on returning to Bournemouth. May, 1883, she had influenza, which set up active symptoms in the diseased parts, and general breaking up seemed imminent (See Case XXXV.), but it passed off. September, 1883, at Malvern, she had sharp hæmoptysis, and lost ground, but came back and picked up as usual. January, 1884, she had congestion of the back of the left lung from cold and fatigue at amateur theatricals, but recovered; and when she went home for a holiday this summer, she was still holding her ground well, always continuing her restorative and antiseptic treatment.

November, 1884. I hear that some one has persuaded her to accompany a friend to St. Moritz, which I believe is a great mistake: but I shall look with interest for the result of so dangerous an experiment.

Case XXXII. February, 1884. The Rev. ——, æt. 28, Principal of a Welsh School, came to Bournemouth to consult me for aching pains in the right side, cough, muco-purulent expectoration, short breath in walking, loss of flesh and strength, incapacitating him for his duties. Had pleurisy or pleuro-pneumonia in the right side two years in succession, from which he was supposed to have recovered, when, eighteen months after the last attack, and while much over-worked in his duties, he joined in foot-ball last Christmas, and became very ill with symptoms of lung congestion, and the present cough and expectoration set in. No disease in the family, but in 1878 a London doctor cast a suspicion on the condition of the right lung. Expectoration contains no bacilli, temperature normal. Right chest increasingly dull from lower half of scapula downwards, and in front from fourth rib downwards. A patch of deep, rattling—almost gurgling—rhonchi below the angle of the scapula, and medium crepitation around; no creaking. I ordered a succession of blisters over the diseased area. Antiseptic inhalations, tonics and expectorants; exercise in the Branksome Park and Talbot Pine Woods in all suitable weather, good food, and rest from work. In eighteen days the ominous rhonchi had gone, and resonance was improved; cough nearly gone. Health rapidly recovered, and he returned to work in a month after coming to Bournemouth. In March Dr. —— wrote that he had examined him, and he considered his chest quite sound. In May, Dr. —— again examined him, and reported "the chest all right, health good." January, 1885, I have just heard that he remains quite well.

Considering that up to the date of his visit to me he had been getting worse, although under good medical treatment, his permanent recovery here, in so short a time, from a threatened break-up of the right lung says much for the "conditions of existence" which he found at Bournemouth.

Case XXXIII. Mrs. ——, æt. 31. August, 1884, the London physician who sent her to Bournemouth wrote that she had consulted him specially for severe hæmoptysis, that "she was very ill"; there was "considerable mischief at the left apex," and he "did not think the right was free." I found that she had been living in a malarious district of Kent, and was suffering much from periodic neuralgia in the left side of the chest, neck, and shoulders. Married nine years; has had six children, of whom only two are living. Has had recurrent hæmoptysis since last March, chiefly about the menstrual periods, which have been irregular. A severe hæmoptysis at Margate in June, and again lately in London. Left lung deeply disintegrating and excavating in the upper part, back and front. Right upper, dull. Bacilli found in sputa, in groups of four to eight. Aspect of malarious cachexia, very weak, very little power of taking food. Mother died of phthisis, æt. 37. No other complaint in the family.

Her London physician had put her on antiseptic treatment, with pancreatic emulsion, iodine liniment, and hypophosphites, which I ordered to be continued. But, considering the malarious cachexia, I added arsenic and bark, which soon removed her neuralgia; but she was not making progress otherwise, which I attributed to her being in unsatisfactory lodgings, too near the sea-level. She was therefore moved to an excellent house in the midst of the pines, in the best part of Boscombe, and she was so benefited by the change that in six weeks she was hardly recognisable as the same woman. Her chest symptoms had become passive, her appetite and nutrition improved, and scarcely a trace was left of the cachectic aspect so marked at first. The children, too, who were out of health, showed marked benefit from the change. In fact, so remarkable was the effect of the new "conditions of existence," that her husband decided to buy the house they were in, and to make it their permanent home, although very inconvenient to him, as it involved his going backwards and forwards to London and to Kent, to his business. (For further Cases see Chapters VI. and VII.)

CHAPTER VI.

DISEASE TRACTS—MEDICAL AND CLINICAL.

Disease Tracts of the Human Organism and the Organs and Secretions connected therewith—Recapitulation of Subjects treated in Previous Chapters—The Naso-pulmonary Tract with its Associated Organs, etc., the site of the Majority of Complaints for which Patients are sent to Bournemouth — Natural Arrangement of Winter Cough into Five Classes of Cases—Discussion of these—Course of Neglected Naso-pulmonary Catarrh—Accidental Occurrence of Phthisis as a Complication—Illustrative Case—Intercurrent Catarrh may light up Passive Phthisis into a Fatal Blaze—Illustrative Case—Prospects of Successful Treatment in Different Classes and Stages of Naso-pulmonary Catarrh—Importance of sufficiently prolonging Climatic Advantages—No Treatment will be permanently successful that does not attack the Constitutional Tendencies—The Treatment of Diathesis is the Secret of Therapeutic Success—Relation of Chest Disease and Skin Disease—Illustrative Cases—Importance of Climatic Influences shown by Analysis of Cases—Special Effects of Bournemouth on the Morbid Conditions in Destructive Lung Diseases—Enumeration of these Morbid Conditions, and importance of Favourable Conditions of Existence for their Successful Treatment—Objections to "a Shutting up System"—Therapeutic Elements of Climate—Effects of Sea Air on the Mouth, Gums, and Pharynx—Opinions of Dentists—Illustrative Case.

In my original design of this book I intended to devote a considerable portion of it to a separate discussion of the effects of the climate of Bournemouth upon the "various disease tracts of the human organism, and upon the organs and secretions connected therewith," which I had arranged as follows:—

a. The Naso-Pulmonary Tract. *b.* The Alimentary Tract. *c.* The Genito-Urinary Tract. *d.* The various Serous Tracts. *e.* The Cutaneous Tract. *f.* The Lymphatic and Perivascular Tracts. *g.* The Lacteal Tract. *h.* The Venous Tract. *i.* The Arterial Tract. *j.* The Cerebro-Spinal Tracts.

But in discussing and estimating the value of the "conditions of existence" at Bournemouth in relation to their influence on health and disease, I have found it advisable to introduce many of the materials originally intended for this division of my subject; and as the preceding chapters have occupied much more space than I expected they would require, and as I have illustrated them with clinical records; I shall avoid as far as possible going over the same ground again.

In this chapter, therefore, I shall confine myself to considering in more detail the first of the important disease tracts which I have enumerated, viz.: The Naso-Pulmonary Tract, and its associated organs. I have selected this because it is the site of the majority of the complaints for which patients are specially sent to Bournemouth.

In Chapter IV., on "The Pine Woods," I have discussed at length the sanitary and curative armamenta of an antiseptic kind so essential to enlightened modern medical treatment, illustrating the effects of these by notes of cases.

In Chapter III., on "Marine Cachexia," I have dwelt somewhat at length on climatic influences in relation to the functions of the liver and digestive organs, and to the rheumatic and gouty diathesis, and to those conditions of the blood which play such important parts in the diseases of the respiratory and circulatory organs. These observations I have also illustrated with cases.

In Chapter II., on the "Climate of Bournemouth," I have attempted to show how the geographical, geological, and meteorological combine with the antiseptic, camphoraceous, balsamic and other peculiarities to produce "conditions of existence" specially qualified for the successful treatment of large classes of disease.

In Chapter V., "Medical and Clinical," I have supplemented and summarised these "conditions of existence," further elucidating and illustrating them with cases.

Most chest affections may be practically included under the general and popular heading of "Winter Cough,"—as I found it convenient to do after the course of elaborate clinical investigations which formed the subject of my Lectures, on diseases of the respiratory organs, delivered at the Royal Hospital for Diseases of the Chest, and of my work on Catarrh, Bronchitis, Emphysema, Asthma, &c.

These cases of Winter Cough, when minutely scrutinised, naturally arrange themselves under the following classes:—

1. Cases in which there are physical signs of Emphysema and not of Bronchitis, and in which there is no history of previous Bronchitis.
2. Cases in which there are physical signs of Emphysema and not of Bronchitis, but in which there is a history of previous Bronchitis.
3. Cases in which there are physical signs of Bronchitis and not of Emphysema.
4. Cases in which there are physical signs both of Emphysema and of Bronchitis.
5. Exceptional cases, in which there are no physical signs either of Bronchitis or of Emphysema.

I pointed out, in my Lectures, that, although the majority of "Winter Coughs" are either cases of bronchitis, or of bronchitis and emphysema conjoined, there is a certain number which do not belong to either of these classes, and require to be carefully distinguished in practice. In enumerating the chief of these "Exceptional Cases," I showed that, as pulmonary consumption is accompanied by cough—Winter Cough may be only a phase in the history of consumption.

After Consumption, the following headings comprise the principal cases not included under bronchitis and emphysema.

They may exist separately, but are often found associated in a single case.

a. Post-nasal catarrh.

b. Chronic recurrent laryngeal and tracheal catarrh.

c. Ear cough.

d. Follicular disease of the pharynx.

e. Superficial inflammation and serration of the edges of the soft palate.

f. Elongated uvula becoming relaxed and œdematous with every fresh attack of cold.

After examining carefully into all the circumstances of each of these five clinical groups, I pointed out, that it is —to the gradual creeping down of catarrh, from the nose to the throat, from the throat to the bronchi, and from the large bronchi to the smaller ramifications, and to the greater and greater difficulty of eradicating the disease as it gets deeper and deeper, that our special attention must be directed. Thus we see the importance of leaving no means untried which can give a chance of radically and permanently removing every lurking trace of bronchitis, in every case of this disease that comes before us for treatment, before we let a patient consider himself safely cured. We must not be satisfied because the cough is better, or even if it has left; for this may *be the case, under favourable atmospheric influences,* and yet enough disease lurk behind to bring it back with the first return of an irritating cause.

Again, after examining into the causes of *short breath* in the five groups of cases, it was found that we came back to the leading point of importance,—that when the breath is short in bronchitis, it is generally from diminished calibre of the *naso-pulmonary* air-passages. When it is only short in winter, it is because this condition is still susceptible of relief by summer weather. When it is permanently short, it is because the *affection of the naso-pulmonary tract* has crept down into the deeper recesses of the lungs, and become a more severe and abiding affection. And, putting all these sets of cases together, we found that these same *conditions of the naso-pulmonary tract* are the principal causes of variations in the degree and in the persistency of the short breathing, whether the bronchitis is complicated with emphysema or whether it is not—in a word, that although emphysema is unquestionably a cause of short breath, and, in the most severe cases of this disease, a very serious cause; yet that bronchial disease—diminished calibre of the naso-pulmonary passages—is the condition which claims the most important consideration. Emphysema is but a vestige, of which diminished calibre of the air passages is the commonest cause.

Then, in order to show the extreme importance of affections of the nasopulmonary tract, and the complicated combinations of disease which their neglect may engender, as demonstrated by the long series of cases analysed in my lectures, I enumerated the stages in *the ordinary course of naso-pulmonary catarrh*—when allowed to take its chance without treatment either by medicine, regimen, or climate, in a person not specially influenced by hereditary predisposition—thus:

1. For one or more years a great tendency to colds in the head after exposure to wet, cold, or wind, and frequently without such exposure, from mere barometric changes in the atmosphere; the colds gradually becoming more tedious and difficult to remove, till at length one cold has hardly disappeared before it is reinforced by another. (This was illustrated by five tables of cases.)

2. A gradual extension of the colds in the head down the throat, or a sudden tendency to attack the throat first instead of the nose. (Illustrated by an analytical table of cases.)

3. A gradual extension of the colds in the head or throat down the larynx and trachea into the bronchial tubes; or a sudden tendency to attack the tubes first, instead of the throat or nose. (Illustrated by a table of cases.)

4. Supposing none of the attacks to have been very severe or protracted, these catarrhs in the nose, throat or chest clear off completely, so that—when free from cold for some

time under fortunate circumstances and warm weather—the patient appears quite well, no short breath or cough remaining. (Illustrated by abstracts of cases, and two tables.) It must also be observed that all the effects of the gradual progress described in headings 1, 2, 3, 4, may be produced, at a blow, by a single very severe and protracted catarrh.

5. From the frequent repetition of the above states, or through some unfortunate circumstances having induced one or more attacks of unusual severity, some of the bronchial tubes *become dilated*, the naso-pulmonary membrane becomes so much thickened that it does not recover its normal state in the intervals of the attacks, or even under the influence of summer weather; and thus the breath becomes permanently short, and there is an habitual cough and expectoration. Both the short breath and cough in this stage are much improved during summer weather, but do not actually depart. (Illustrated by a Table.)

6. *It is from this point* that *the more serious consequences of winter cough begin to date.* The dilated tubes keep up an offensive and wasting expectoration. The thickened naso-pulmonary membrane, and consequently diminished calibre of the air-tubes, permanently obstruct the freedom of respiration; less complete and rapid chemico-physiological changes occur in the residual air of the chest; the vascular circulation, upon which the aëration of blood depends, is impeded; and an abnormal tax is put upon the right heart in its duty of propelling the blood through the lungs. Thus, retrograde venous congestion of all the organs in arrear of the right heart gradually increases, and the right heart itself hypertrophies to meet its increased work.

7. The obstructed expiratory tide keeps up a constant undue backward pressure upon the air-cells, the elastic walls of which gradually yield to this, and the capacity of the cells becomes abnormally enlarged. This is greatly aggravated by the frequently recurring attacks of cough, consequent upon the other conditions, and the cells become stretched beyond

their powers of recoil—that is to say, they become permanently emphysematous.

8. The overstretching and attenuation of the walls of the air-cells interferes with the free circulation of the blood in their capillary vessels, and adds another to the already existing interferences with blood aëration, and another to the already existing causes of hypertrophy of the right heart, and of retrograde venous congestion.

9. A condition now exists in which every day produces new mischief of the most serious character. The overstretched, ill-nourished walls of the air-cells degenerate, and lose, thereby, still more of their power to resist the distending influence of the backward pressure of air; and becoming, as it were, rotten in their texture, they tear and break up under the shocks of the convulsive coughs common to this stage of the complaint. The permanently obstructed venous circulation, after deranging the action of the stomach, liver and kidneys, leads to disease of these organs, culminating in dropsy.

Such is a fair sketch of the gradual progress of a neglected case of "Winter Cough" due to nasopulmonary catarrh. In its course many accidents may occur to which I have not alluded. As a matter of fact, a case seldom runs on through all its stages without such accidents, and when they occur they precipitate all the evil consequences, or probably terminate the patient's life before the case has run through all its usual stages.

One of these accidental complications is so full of peril, and unfortunately, so apt to occur, that I must stop to give a caution against its neglect.

Every now and then an attack of bronchial catarrh will be accompanied by active congestion of portions of lung tissue, and if the patient *is predisposed to tuberculous* disease, and happens at the time to be in depressed general health, there will be great danger of the occurrence of tuberculisation in the congested tissue—and I need hardly say that we are then brought face to face with all the dangers and difficulties of consumption in addition to those of winter cough.

The following case occurring in a member of our own profession is a sad, but apt, illustration of the above remarks.

Case XXXIV. In November, 1884, I was consulted by Dr. ——, æt. 40, a celebrated surgeon from Wales, noted for his capacity for work—one of those local surgeons who perform all the difficult operations of surgery with as much facility as ordinary people cut out pictures with a pair of scissors! Accustomed to ride, drive and walk long distances, go anywhere and do anything—one of those doctors of whom the poet wrote:—

> "Ever serene and calm himself, he goes.
> Heedless of place and time, where duty calls;
> Be it to soothe the mightiest monarch's woes,
> Or suffering penury in prison walls."

His lungs were emphysematous throughout, with general asthmatic wheezing, and in the right upper lobe was a deep cavity surrounded by a considerable area of disintegration. The sputa contained numerous bacilli and *débris* of air-cells. He had been subject to spasmodic asthma sixteen years. The first attack occurred suddenly in the night, after a fatiguing day's practice, and was very severe for three hours. It had been *preceded however by soreness of the chest* for several days, and was followed by troublesome bronchial cough for a long time. Nevertheless, he went on with his work as usual, and got sufficiently well, that he thought no more of his complaints till a second attack of severe spasm seized him after running fast up a steep hill. This lasted two hours and then left; but from that time he remained subject to frequent asthmatic attacks and was persistently "wheezy."

He went on with his work again, disregarding his complaint, till three years ago, when he had pleuropneumonia of the right lung. As soon as he thought himself convalescent he returned to his usual hard work, and then had hæmoptysis of 3 or

4 ozs. for four days, no more since, but he says, " he has been slowly going to the bad ever since." In November, 1883, Sir W. Jenner advised a journey to Melbourne, but instead of going he returned to his practice; but he has gradually become more and more incapable of performing his duties till at last he has been forced to give up, notwithstanding his great pluck.

Here the long-continued neglect of recurrent nasopulmonary catarrh and local pulmonary congestions culminated in phthisis with tuberculisation, which no doubt might have been prevented had the case been properly treated at once in its early stages.

But independent of a tuberculous diathesis, we must always regard these attacks of active congestion of portions of lung with great apprehension, and lose no time in dispersing them; for their repetition in the same part, or their accidental occurrence with unusual severity, will lead to disintegration of the affected tissue, and even though unaccompanied by the development of tubercle, the patient's life will be placed in great jeopardy by a chronic wasting disease having many of the characters of tubercular consumption.

There is another aspect in which it is all-important to consider the risks above detailed. I have spoken of the possibility, the probability, indeed, that some local congestion, in the course of this extension of nasopulmonary disease, will set up disintegration and tuberculisation of lungs in persons with a consumptive tendency, and of the disastrous consequences of such an incident. But this is nothing compared to the result of *neglecting an attack of nasopulmonary catarrh in a patient who is already suffering from tuberculous lung disease*, however limited in extent, or who, having suffered from such disease, has so far recovered as to have passed into a stage of quiescence or obsolescence. (See Case XXXI., p. 181.) It is in these cases especially that we see diseased processes start into a positive blaze of activity—like the dying embers on a forge under the influence of the bellows—and just when all seemed hopefully progressing towards a cure, the patient is "wrecked in port."

The following case, although obviously beyond the hope of cure on her arrival at Bournemouth, will in other respects well illustrate the above remarks.

Case XXXV. Mrs. ——, æt. 23. Was brought from Cumberland, September, 1884, having been laid up for a month in London on her way. Her doctor at home wrote:—

"Mrs. ——, has been under my care a twelvemonth. At my request she wishes for your advice as to her present state and future treatment. She resides in close proximity to the mountains of the lake district; our winters are long and severe, rainfall great, wind strong, with heavy falls of snow and sleet, which render it impossible for the patient to get out of door exercise during the winter. She has been married twenty months, miscarried in third month, twelve months ago, . . . three days before which she had a sharp attack of hæmoptysis. . . . . December complained of great lassitude, etc., and in January she became so ill that she was unable to leave her room . . . . had colliquative diarrhœa, night sweats, temperature 100° to 102°, wasting, menstrual suppression, and physical signs and symptoms of phthisis." The physician who attended her while laid up in London, wrote:—"She has all the objective and subjective signs of phthisis, and a systolic murmur to right of sternum, due I think to pressure of enlarged bronchial glands."

On examination I found no pressure signs, but soft hæmic bruits widely heard. Extreme debility in a most fragile subject, fainting on attempting to take exercise; considerable but not extreme emaciation. There were cavities and extensive consolidation and disintegration in both lungs, as low as the inferior angles of the scapulæ behind, and the sixth rib in front. The sputa contained bacilli and *débris* of air-cells; power of taking food bad. As she had been skilfully treated both at home and in London, with the assistance of every care and comfort that wealth could provide, before she came to Bournemouth, it did not appear probable that she could live long. But she was placed in the best lodgings on the East Cliff among the pines, free use of antiseptics enforced, and pancreatic emulsion (she could not take cod liver oil), restorative medicines and foods, counter-irritants, etc., prescribed. Gradually the disease became quite passive, considerable areas of breathing lung were reclaimed by the clearing up of catarrh and disintegration, and by Christmas no bacilli could be detected in the sputa although several specimens were examined. The weather being fine she went out for drives of an hour at a time and did not faint as on her arrival. Her period of arrest continued up to April, and both she and her husband were looking forward quite confidently to getting home at the end of May, which then seemed quite plausible;—when most unluckily, while driving in a pony chair on the sands with the tide coming in, the pony jibbed just as a great wave broke on the shore, and completely drenched the chair and the patient, alarming her so that she fainted. They were some way from home, and had to ascend the cliffs to her lodgings. She arrived cyanosed with chill and shock, from which she was with great difficulty revived, when the lungs *blazed up* with broncho-pneumonia, the heart failed, aëration of blood became impossible, and she died. (See Case XXXI., p. 181.)

With regard to what promise we can make as to the effects of treatment—when it can be pursued properly and promptly—in cases of nasopulmonary catarrh, the natural progress of which I have enumerated (pp. 88-90), it is evident that, although the difficulties increase with every stage of the complaint, there is nothing out of the reach of radical cure, at least up to Stage 6. And although from that point the possibilities of complete cure become less and less, there is no stage, even up to the last, that is not susceptible of beneficial treatment, within certain gradually decreasing limits—treatment that becomes of more and more vital importance as these limits get narrower and narrower.

Unfortunately the tendency of all patients is to neglect the early stages of disease, or at most to temporise in the treatment of them, and to wait until organs have become permanently damaged before they adopt sufficiently resolute means of cure. This is especially the case with regard to climatic treatment, which is always *apt to be postponed too long.* At any stage after No. 5 of the headings just enumerated, patients are anxious enough for cure; their troubles and difficulties have become so burdensome to them that the joy of their lives is gone; they will then do everything that their means can command to get cured. But this is not the case in the previous stages; and it is less and less so as we get further and further back in the history, when cure is more and more easy. And this comes, naturally enough, through ignorance on the part of patients as to the probable effects of neglecting their cases in the earlier stages. While, therefore, we should avoid any approach to unnecessarily alarming our patients, it will be our duty to candidly inform them of the dangers with which the natural course of their complaints is beset when left without treatment.

Dr. Hassall in his work on San Remo * has very well pointed out the importance of patients not hurrying away from the climatic advantages, under which they are getting free from their complaints, until they have allowed time for these remedial processes to be substantiated. He says:—"To spend only three or four of the severest months of winter in the Riviera, especially in cases of consumption and bronchitis, and then to return home to the same conditions and surroundings under which their maladies have arisen, expecting at the same time that their short stay will result either in a great amelioration or even cure of the diseases from which they were suffering, is certainly most unreasonable."

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* Op. cit.

Most persons, he says, make the mistake of arriving too late, and leaving too early, as if their only object was to get away from the worst part of the winter weather; "and seem altogether to forget that further and still more important object, a radical and permanent improvement in their health, which can only rationally be expected as a consequence of a prolonged sojourn, and this under the most favourable conditions of climate and weather. No sooner do the early signs of spring show themselves, than very many persons begin to grow impatient, and hasten their return home. . . . . The result of this imprudence frequently is, that all the good derived from a residence at San Remo is wholly undone." (p. 241.)

The clinical sketch which I have now given of the course of affections of the nasopulmonary tract, (which in my "Lectures on Winter Cough" will be found amply illustrated by cases,) shows the way—the insidious way—in which catarrh steals its marches upon its victims; how simple in character and short in duration the first attacks may be, and hence how liable they are to be neglected; how they dispose the mucous membrane to fresh attacks; and how apt each attack is to involve a larger extent of surface than its predecessor; how often it happens that, when once the complaint has reached the finer ramifications of the bronchi, it lurks there still, even when the larger tubes have been restored to temporary health; every fresh attack of catarrh in the larger passages supplying the lurking enemy with reinforcements, and enabling it to advance from its fastnesses, and encroach further and further upon the respiratory tract, until, at last, it needs but a breath of wind upon the lining of the nose or fauces to raise a storm of rebellion throughout the length and breadth of the nasopulmonary mucous membrane. And this will also happen, it may be added, even when the finer tubes have recovered their normal condition, if the nasopharyngeal and larger bronchial passages remain in a chronic catarrhal condition, as they are so apt to do with patients who live in an atmosphere charged with dirt or other irritating matters, or under conditions which expose them to frequent changes of temperature about the head, face, neck, or throat, or to wet feet or legs. (See Cases XIX. and XXII.)

Thus is it seen how very much that is connected with Winter Cough and destructive lung disease, in a practical sense, centres itself in catarrh. And it is to this state, and its causes, and to the vestiges of this state, that we have always to direct our treatment, whether it be medicinal, hygienic or climatic.

But we must never forget *the general conditions favouring or producing a morbid susceptibility of the mucous membranes.* No treatment will be permanently successful, even if it gives temporary relief, that does not aim at removing or neutralising the constitutional tendencies contemporaneously with other remedial measures.

I have always made this a leading feature in my own treatment of disease, and I have always laid great stress upon it in my lectures and books addressed to students and to medical practitioners, because I have always found that it is too apt to be lost sight of in daily practice. I am again induced to lay especial stress upon it now, because I have been surprised and distressed to see how many patients come to Bournemouth with the notion that they are going *to be cured by the influence of the climate alone.* Many of these patients have already been from climate to climate, running after the same "Will'o-the-Wisp"; and when at length some accident has obliged them to submit to a searching medical examination, I have found them saturated with gout or rheumatism, or with their constitutions still under the influence of syphilitic, malarial, saturnine or other poisons, or impressed with some deteriorating hereditary taint, requiring special treatment—treatment without which they have no chance of deriving benefit from the climatic influences they have sacrificed so much to obtain, but which are so potent in their power for good, when utilised as "conditions of existence" under which medical treatment is conducted, or by which it is followed. (See Cases in Chapter V.)

I may repeat here therefore, the words with which I concluded my seventh Lecture on Winter Cough :—

"When treating of the hereditary transmission of a tendency to nasopulmonary catarrh, I pointed out that this was due to the hereditary nature of certain diathetic states ; and when treating in detail of the properties of mucous membranes and of the various modes in which they are affected, I pointed out that all the phenomena of catarrh may be brought about by the presence in the blood of such impurities as proceed from mal-assimilation, imperfect digestion, rheumatic, gouty, syphilitic, typhoid, rubeoloid, and other poisons ; and I pointed out the analogy in this respect between affections of mucous membranes and affections of the skin.

"It is in relation to treatment that these facts assume the greatest importance. We may as well expect to cure a skin disease dependent upon mal-assimilation by external applications alone, to cure an attack of gout by poulticing the great toe, or to remove a syphilitic affection of the eye by the application of simple lotions, as to effectually treat an affection of the nasopulmonary mucous membrane, dependent upon similar general causes, by remedies directed only to the catarrhal condition of the membrane. We may, indeed, in the one case and in the other, produce temporary local amendment by such local and narrow-minded treatment; but we know that the local disease will recur again and again, so long as we neglect the general condition.* When I say, then, that the first thing in treatment is to provide against fresh attacks of catarrh, I ought to place first on the list of means of such protection, the treatment of whatever general conditions we can discover, which, acting from within, may favour or produce morbid susceptibility of the mucous membrane of the air passages. Everything that we learn from physiology and pathology, all that we know of etiology, confirmed by our deepest clinical experience, conspires *to hold up the treatment of Diathesis as the secret of Therapeutic success.*" (pp. 179, 180.)

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* See some interesting Notes on Asthma by Dr. Robert Saundby, in the "Birmingham Medical Review" of September, 1884.

The connection between some chest affections and some diathetic skin complaints is illustrated every day in practice. I well remember a very graphic instance of this that occurred in my practice some years ago, in a very old and distinguished beau. (Case XXXVI.) His personal attractions had fascinated four ladies of title, each of whom he had married and out-lived, when he first came under my care at about seventy years of age. As he had just married a fifth wife, and a very young woman, he was greatly concerned at the appearance of a large patch of eczema on each shin, which was so irritable that he could not help scratching it at inconvenient times and places. I found, however, that, whereas during his life he had become more and more subject to attacks of gout and of gouty bronchitis with asthmatic complications, since the appearance of the eczema he had been in excellent health and had nothing else to complain of. I persuaded him therefore, not to use any local means of cure for his eczema, but merely to apply a soothing application to allay the worst irritation, and adopt constitutional treatment for his gouty diathesis, and whenever he found any return of his tendency to chest complications, to increase the constitutional remedies, and apply an irritant to his eczema. In this way he went on for several years enjoying very good health without any serious attack of illness, in fact he was so well that he could not believe there would be any risk in having his eczema quite cured, and as he was leading a fashionable life with his young wife, and was much horrified at being sometimes caught scratching his legs in society, I had many a battle with him because I would not "*quite cure*" them.

The consequence was that he left off consulting me for about a year. But one day, at the end of that time, I was summoned in great haste by an imploring note from his wife, saying that "he had been suffering for some days from 'inflammation of the lungs,' and no treatment appeared of any avail," and that, "as he was then about eighty, it was thought he must die." He certainly was in a most critical condition. But I found that he had *not inflammation of his lungs,* but an intense bronchial asthmatic attack, which had lasted so long and so enfeebled him that it did not look as though he had much chance of recovery. I guessed at once what had happened, and asked to *look at his legs,* which I was not allowed to do till a humble confession had been made that he had disregarded my advice. "They had been cured; nothing else would satisfy him."

As a last chance for the vain old man I ordered at once a blister on each shin; as the blister drew, his chest symptoms cleared up; and with a most irritable patch of eczema on each of his legs, which he learnt to prize above all else in this world, he lived two years longer in fair health.

The following two cases will also illustrate this relationship between affections of the skin and of the nasopulmonary tract of mucous membrane, at the same time that they show the suitability of the climate of Bournemouth for such cases:—

Case XXXVII. April, 1884. Master ——, æt. 5, was brought to me from Somersetshire, on account of asthma and skin complaint. A miserably ill nourished fractious looking little boy of pale earthy complexion, covered with eczema and psoriasis on his face, limbs, and body, showing by the numerous scratches signs of much irritation. Said to have been "free from asthma" three days; but he was still wheezing much, his chest full of catarrhal and asthmatic rhonchi from end to end, and his respiration much distressed by undressing and examination. Had only been "free from asthma" one month during the last twelve, and then not better than now; when the rash is worse asthma keeps off, but if the rash gets better asthma comes on, and lasts till the rash can be got out again. Urine highly charged with lithates. Paternal grandmother asthmatic. Paternal grandfather subject to some skin complaint. Child's father was sickly when young, now healthy. Child's elder brother had skin complaint at six months old, but recovered. No definite history or signs of syphilis.

I advised that the child should be placed in the house of a medical man at Bournemouth, and treated with La Bourboule Water and syrup of iodide of iron; more careful diet than he was accustomed to, starch baths and glycerine of borax to the skin; pancreatine with food, and lobelia and ipecacuanha occasionally if required.

The climate suited well, and enabled him to be out a great deal without catching cold; there was a great improvement in nutrition, bronchial catarrh and asthma, and the skin complaint was mending. He was definitely less asthmatic when he took pancreatine with his food than when without it. His parents thought him so well, that in August they fetched him home.

Case XXXVIII. July, 1883. Master ——, æt. 8. Was brought from London to Bournemouth by his parents for my opinion as to what to do to stop, if possible, his increasing liability to attacks of "croupy catarrh and bronchitis." I had seen him in consultation with the family doctor before leaving London, suffering from one of the attacks so described which had come on in the midst of scarlet fever, and was seriously endangering his life in consequence of the state of the throat at the time. His attacks had recurred at intervals of not more than a month, and, although living in a healthy suburb, he was becoming "more and more of a hot-house plant," from his liability to catch cold on going out. "When he catches cold he always has *herpes about the mouth, and if herpes gets better chest becomes worse*"; at the time of consultation he had patches of herpes on the forehead and about the mouth. No skin disease in the family, but he had "eczema" in the flexures of joints when an infant, and has had eczema or herpes off and on ever since. No syphilitic taint can be made out after careful inquiry of the father; teeth normal. I found that his attacks of "croupy bronchitis" had an unquestionably asthmatic character, and that sometimes in the intervals of attacks he had "sneezings and wheezings," or, what I have described elsewhere, as "sneezing asthma."

Left upper lobe less resonant than right, some asthmatic wheeze there and difficulty of breathing. No moist rhonchi, but his mother considered him "free from attack," herpes being out, but that it was about his time for a seizure. I prescribed five drops of etherial tincture of lobelia to be given if any signs of attack should occur, and to be repeated every three or four hours; La Bourboule water to be drunk daily, and compound camphor liniment to the chest.

I advised that he should not be taken back to his home, but wait a week or two; and if the climate suited, he should be placed in a doctor's family at Bournemouth, and remain under watching till next summer.

After seventeen days, his mother reported that all the usual symptoms of an attack began but were dissipated by the lobelia and liniment, and that following this the herpes came out on the mouth and forehead. On examining his chest the loss of resonance had disappeared, showing that it was from impeded respiration. He was much better in himself and had escaped colds much better than at home.

Following my advice, therefore, as the climate evidently suited, he was left in charge of a doctor here till the end of May, 1884. He was well watched without coddling. The Bourboule water was continued. He had a few threatenings of attacks—always warded off by a dose or two of lobelia—and on one occasion a bronchial catarrh threatened and required a poultice and some steam, but easily yielded. The herpes was obstinate, but eventually got well; and he went home in excellent health, not a trace of disease left, none of his old "hot-house plant" habits required; and his mother wrote, "the improvement which has taken place seems fully to justify the expectation formed of the result of the proposed treatment."

Having, then, ascertained what diathetic or other constitutional state exists, and prescribed the proper course of remedies for this, we put our patient in a fair position to obtain the full benefits of the favourable "conditions of existence" in which he has placed himself by his change of climate.

The extreme importance of climatic influences in affections of the nasopulmonary mucous tract and the associated respiratory organs, cannot be more forcibly demonstrated than by the analysis, which I published of cases at the Royal Hospital for Diseases of the Chest, for the purpose of showing to what extent and in what forms climatic influences were found to have been the original causes of disease, the causes of its renewal or the causes of the aggravation of its complications.

Thus, the first attack of cough was found to be ascribable to *cold and bronchitis* in 73 per cent. of all the cases examined.

The cough had not been aggravated by any other causes than *fresh colds* in 70 per cent., and *fresh colds* were the special causes of short breathing in 22 per cent., and in 37 per cent. the *colds* which had accounted so largely for the aggravation of both the short breath and the cough, began as attacks of ordinary nasal catarrh (34 per cent. began in the nose, and 3 per cent. in the throat and nose.)

Wet feet and *getting wet* were the most potent causes of fresh colds in 31 per cent., *cold winds* in 10 per cent. *Sudden changes of temperature and draughts of cold air*, were the most potent causes of fresh colds in 37 per cent., and aggravated the cough in 2 per cent.

Damp and fog were the most potent causes of fresh colds in 19 per cent., aggravated the cough in 4 per cent, and were the "things most inclined to make the breath short" in 24 per cent. *Cold weather* was the thing most inclined to make the breath short in 7 per cent. *Change of weather* aggravated the cough in 7 per cent., and especially affected the short breath in 7 per cent., while *Summer weather* produced freedom from cough in 45 per cent. and relieved the short breath in 29 per cent.

From this clinical analysis it would appear then, that if these unfortunate sufferers from " Winter Cough " could have been protected from " sudden changes of temperature," " damp and fog," " cold winds," " draughts of cold air," " wet feet," and " wet coats and dresses," the large majority would have been kept free from their coughs.

As I am in this book specially addressing myself to medical men, it is unnecessary for me to do more than to ask them to refer back to the Chapters (especially Chapter V.) in which I have placed before them the " conditions of existence " to be found at Bournemouth, to convince them of how well these will supply all the surroundings necessary for the satisfactory medical treatment of affections of the nasopulmonary mucous tract, and the organs of respiration associated therewith.

I must, however, once more call their special attention to the ANTISEPTIC CONDITIONS to be found at Bournemouth, which as I have shown, give it peculiar advantages in the treatment of the most serious and most intractable forms and stages of chest disease, as well as of those insidious early stages of septic infiltration and septic infection, which recent scientific investigations and practical experience have invested with such grave importance. (See Chapter IV. " The Pine Woods.")

If we carefully consider what are the principal morbid conditions with which we have to fight in our battle with destructive lung diseases, we shall find how serious a place is occupied by primary, secondary or concomitant septic influences; and hence how great is the importance of surrounding patients suffering from such conditions with an atmosphere which is not only pure and aseptic, but definitely and potently antiseptic, at the same time that other qualities and associations render it protective and remedial in its influence upon the nasopulmonary tract of mucous membrane. (See Chapters IV. and V.)

The morbid states connected, at different stages, with loss of weight, blood spitting, lung disease, and the other phenomena of phthisis, may be thus enumerated.

1. Abnormal physiological states, primarily connected with the digestive and assimilative processes, producing constitutional decline.

2. Disintegrations of tissues and organs dependent upon abnormal nutritive processes.

3. Abnormal growths of adenoid, epithelial and connective tissues, and the results of abortive formative processes.

4. Catarrh, hyperæmia, inflammation, gangrene.

5. Decomposition of the *débris* of disintegrated tissues, of the products of disease, and of the abortive attempts at repair above referred to.

6. General septic disease or septicæmia.

7. Secondary local diseases of septic origin.

8. The presence of microzymes.

And what we have to treat in the large majority of cases of winter cough is a combination of some or all of the following conditions:—

1. Dilated heart.

2. Collapsed lung.

3. Emphysema.

4. Thickened nasopulmonary mucous membrane, with narrowing of the air passages.

5. Catarrh of the nasopulmonary mucous membrane of greater or less extent.

6. An undue susceptibility of the nasopulmonary mucous tract.

7. Local and general conditions (diathetic, constitutional, hereditary) favouring or producing susceptibility of the mucous membrane.

8. Dilated tubes (bronchiectasis).

9. Disintegration of lung tissue (destructive lung disease).

10. Cough and short breath symptoms of the existence of the conditions enumerated above.

When we look over this list of possible, probable or inevitable difficulties besetting disease of the chest in its different forms, we cannot wonder that many of them prove insuperable when patients have to be treated within city walls, or in unsuitable country houses, in insanitary climates, or under any circumstances in which long confinement to the house is an inseparable condition.

If we shut up our patient month after month, and perhaps winter after winter, in warm rooms with little exercise, we need not be surprised if we add fatty degeneration to his emphysematous air-cells; fatty degeneration to his heart, the muscular strength of which is so important in keeping up the pulmonary circulation; biliary congestion to his liver, already disposed to be overcharged with blood; fat to his omentum, to impede the free action of his diaphragm; fatty degeneration and paralysis of the diaphragm itself, the normal condition of which is so essential to his respiration, and also, as recently discovered, essential by its pump-like action to the maintenance of the lymphatic circulation, and hence to the prevention of dropsy (Klein); dyspepsia to his digestive organs, the vigour of which is essential to the healthy nutrition of his tissues;—in fact if we adopt "the shutting up system," we need not be surprised if all our treatment should fail to save our patient, or if, after a dreary hypochondriacal life, he should become prematurely old, and die of apoplexy, paralysis, or dropsy.

Can we wonder then if both doctors and patients anxiously seek for climates in which to avoid as far as possible "this shutting up system" of treatment!

I cannot better conclude this chapter than by quoting the following passage from an article on the "Treatment of Disease by Climate," by Dr. Edward I. Sparks in Dr. Quain's New Dictionary of Medicine: "Though we can scarcely say with accuracy that change of climate is a specific for disease, yet much may be effected by it in relieving symptoms, and in assisting the reparative powers of the organism by improving the general health. . . . Change of climate, we must premise, is only a relative term. It does not necessarily involve the idea of removal to a great distance from the patient's home. A few miles' journey from the town to the country, from inland to the sea shore, from the plain to the mountain, often suffices to produce marked results." (See Chap. VII.)

"The therapeutical elements of most importance in any climate are: 1. Pure air free from dust and organic particles. 2. Abundance of sunshine, without excessive heat, so that much time can be spent in the open air. 3. A temperature without extremes, so that the body is not exposed to the risk of great variations of heat and cold—equability. 4. Absence of violent, very cold, or very hot winds, at any rate of long duration (in this is involved the element of local shelter). These four elements should be present in each of the subdivisions of climate which therapeutical classification renders necessary, viz.:—" (*a*) The sea shore; (*b*) Mountains; (*c*) Inland wooded districts; (*d*) The open sea."

If we add to the above four elements the all-important one of an antiseptic and camphoraceous atmosphere, we shall see how closely they correspond with what I have described in Chapter V. as the "conditions of existence" to be found in Bournemouth and its surroundings.

(For further illustrative cases of naso-pulmonary complaints treated at Bournemouth, see Chaps. V. and VII.)

In Dr. Barety's book on the Climate of Nice, there is the following statement which Dr. West has repeated in his translation:—

"It is also to be borne in mind that the neighbourhood of the sea tends to produce a state of congestion of the mucous membrane of the mouth and gums, and this influence is especially remarkable in cases of granular pharyngitis." (Op. cit., p. 64.)

As I had not myself seen any confirmation of the correctness of this statement as regards Bournemouth, and wishing to ascertain the truth in the matter, it occurred to me that no one should be so well able to settle the question as the dentists. I therefore wrote to three dentists having large practices in Bournemouth, simply quoting Dr. Baréty's statement, and asking, "Is the following statement of Dr. Baréty in his work 'On Nice and its Climate' confirmed by your experience as a dentist?" and I received the following answers:—

"I have gone carefully over my note books and cannot find any cases of irritation of the mucous membrane of the mouth caused by sea air, and I am decidedly of opinion (after ten years' experience at Bournemouth) that it has not such an effect *here*. Cases of stomatitis, simple and ulcerative sometimes occur, but I have always been able to feel assured that they have had their origin either in excessive smoking, or (which is more frequently the case) in a want of attention to the teeth, which has allowed of a large deposition of tartar; and a careful removal of this has been generally sufficient to effect a cure. W. MERSON."

"In my experience the air of Bournemouth does not tend to produce congestion of the mucous membrane of the mouth or gums. I find the climate very favourable indeed for the performance of all dental operations, especially those upon pulpless teeth, which I feel sure can be treated here with a far less percentage of failures than in most other places. In this respect (immunity from alveolar abscesses) it somewhat resembles the climate of Egypt.

"T. WILSON HOGUE."

"In reference to the question whether the neighbourhood of the sea tends to produce a state of congestion of the mouth and gums, I may say that I have not found such to be the case, all cases I have had under my care being traced to other definite causes. ARTHUR MOUNTFORD."

Dr. Baréty's experience at Nice, therefore, does not correspond with that of the Bournemouth dentists, and I think this is accounted for by the fact of the houses at Bournemouth being, most of them, removed from the coast line and placed above, instead of under, the cliffs, as I have pointed out in Chapter II.

This explanation is somewhat confirmed by the following case which occurred after I had received the foregoing letters. There are not more than two or three houses so low down or so near the sea as the one occupied by this patient, which may account for the fact that, in the other cases of follicular pharynx which I have seen here, there has been no evidence of any harm from the sea air, and the climate generally has appeared to favour their cure. But it is a point worth keeping in mind in advising such patients as to the site of their lodgings.

Case XXXIX. A gentleman—who consulted me in London about ten years ago for very severe and longstanding postnasal catarrh and granular pharyngitis, and who since that time had lived in Surrey without any serious return of his complaints, although never absolutely free from them—came to Bournemouth in the summer of 1884 to accompany some old lady relatives who insisted upon taking quarters as near the pier as possible, (altitude about 20 feet above sea level), so as "to get as much sea air as they could and avoid the hills." After they had been there a few weeks Mr. ——— began to suffer from an aggravation of his old complaints, which became more and more troublesome in spite of remedies, so that, although quite well in health, he was very miserable. The part selected agreed so well with the old ladies that he did not like to ask them to move, and could not well leave them. But he got worse and worse, and nothing relieved him till I, at last, obliged him to move farther from the sea and on to higher ground (altitude about 120 feet above sea level).

CHAPTER VII.

SURROUNDINGS.

Boscombe, Westbourne, Branksome Park, treated as Parts of Bournemouth—Parkstone, Upper and Lower—Climate of the two very different—Double Tide to Poole Harbour explained—Tide Table—Freedom from Malaria—Character of the Soil—Description of Upper Parkstone and Constitution Hill, by "Blackwood"—Description of Lower Parkstone, its Climate, etc., by Mr. J. R. Philpots—Southbourne and Southbourne-on-Sea—Description; Climate, Pines—Important as a Change from Bournemouth—Cases Illustrative of this—Notes on Southbourne-on-Sea, by Dr. J. Davison—Construction of Undercliff Esplanade and Houses—Discovery of Mineral Springs, Analysis—Christchurch: its Climate, River Scenery, and Air—Archæological Interest—Salmon Rivers and Fishing—Dr. Mead's Reports—Notes by Mr. G. Brownen, F.C.S.: Geology, Water, etc.—Case illustrating its use as a Change from Bournemouth.

Boscombe to the east of the East Cliff, and Westbourne and Branksome Park to the west of the West Cliff, I have treated as parts of Bournemouth, and they will not require any separate consideration. Their respective situations with regard to sea level may be seen in the list of altitudes (p. 22), and their geology and position on the Cliff line will be found in Chap. VIII. and Plate VII. Part of Boscombe Chine is shown in the photograph from my sketch, Plate III.; and part of Alum Chine (Westbourne) in the chromo-lithograph from my sketch, Plate II. For pictures of the extremely lovely Branksome Chine and Glen, Branksome Pine Woods, the Pines on the East Cliff, Christchurch and other views, I must refer to the series of photographs to be obtained at the Victoria Library, of which a list will be found in the Contents. The subjects of my sketches were not selected for artistic effect, but simply to illustrate geological and meteorological points, important to the questions of climate and health.

PARKSTONE UPPER AND LOWER.

At the foot of the hill which forms the foreground of Plate V., and separated from Branksea Island by a waste of waters, a little church tower, nestling among trees and cottages, shows the situation of the village of Parkstone, or Lower Parkstone; while the hills themselves constitute Upper Parkstone, by which the pretty village in the valley is protected from winds on the north and east. The climates of the two places, therefore, are necessarily very different.

Upper Parkstone has the peculiar freshness inseparable from an elevation of 200 to 300 feet, rising in successive bold slopes of heath and pine wood, and looking straight out into the English Channel, across the singularly beautiful watery landscape over which the sea flows with a double tide. This double tide is an important feature in the climate of both Upper and Lower Parkstone. Without it Lower Parkstone, embowered as it is in deciduous trees, and protected by hills, could hardly keep up a healthful atmospheric circulation in calm weather, but with it there is no possibility of absolute stagnation; while the air of Upper Parkstone is subjected to continually renewed undulations by this ebb and flow at its foot.

The double tide is occasioned by the peculiar formation and situation of the harbour. On the ebbing of the tide down the English Channel, the current flowing between the Isle of Wight and the Hampshire coast sets strongly on the Studland and Swanage Bays, where, meeting with the resistance given by the land, a check occurs, and the tide diverges into two currents, the one flowing into the English Channel, and forming part of the main tide, the other, overcoming the resistance of the narrowed current flowing out of Poole Harbour, drives back that current by its superior impetus, and finds vent within the harbour, thus causing the second flood, until the balance is restored, when the ebbing proceeds uniformly. The rise of water at spring tides at the entrance of the harbour is from six to seven feet, according to the wind and weather.

TIDE TABLES FOR POOLE AND BOURNEMOUTH.

For July and December, 1884.

The following tables give the time of tide at Poole Bar; by adding forty-five minutes to each time the tide at Poole Quay will be obtained. To obtain the time of high and low water at Bournemouth Pier, add fifteen minutes. It must be understood that the table only gives the approximate times, but it will be found sufficiently accurate for all practical purposes :—

July, 1884.	High Water.	Second Flood.	Low Water.
Tuesday, July 1	3.15 a.m.	6.15 a.m.	9.15 a.m.
Wednesday, ” 2	4. 0 ”	7. 0 ”	10. 0 ”
Thursday, ” 3	4.45 ”	7.45 ”	10.45 ”
Friday, ” 4	5.30 ”	8.30 ”	11.30 ”
Saturday, ” 5	6.15 ”	9.15 ”	12.15 p.m.
Sunday, ” 6	7. 0 ”	10. 0 ”	1. 0 ”
Monday, ” 7	7.45 ”	10.45 ”	1.45 ”
Tuesday, ” 8	8.30 ”	11.30 ”	2.30 ”
Wednesday, ” 9	9.15 ”	12.15 p.m.	3.15 ”
Thursday, ” 10	10. 0 ”	1. 0 ”	4. 0 ”
Friday, ” 11	10.45 ”	1.45 ”	4.45 ”
Saturday, ” 12	11.30 ”	2.30 ”	5.30 ”
Sunday, ” 13	1. 0 ”	4. 0 a.m.	7. 0 a.m.
Monday, ” 14	1.45 ”	4.45 ”	7.45 ”
Tuesday, ” 15	2.30 ”	5.30 ”	8.30 ”
Wednesday, ” 16	3.15 ”	6.15 ”	9.15 ”
Thursday, ” 17	4. 0 ”	7. 0 ”	10. 0 ”
Friday, ” 18	4.15 ”	7.45 ”	10.45 ”
Saturday, ” 19	5.30 ”	8.30 ”	11.30 ”
Sunday, ” 20	7. 0 ”	10. 0 ”	1. 0 p.m.
Monday, ” 21	7.45 ”	10.45 ”	1.45 ”
Tuesday, ” 22	8.30 ”	11.30 ”	2.30 ”
Wednesday, ” 23	9.15 ”	12.15 p.m.	3.15 ”
Thursday, ” 24	10. 0 ”	1. 0 ”	4. 0 ”
Friday, ” 25	10.45 ”	1.45 ”	4.45 ”
Saturday, ” 26	11.30 ”	2.30 ”	5.30 ”
Sunday, ” 27	1. 0 ”	4. 0 a.m.	7. 0 a.m.
Monday, ” 28	1.45 ”	4.45 ”	7.45 ”
Tuesday, ” 29	2.30 ”	5.30 ”	8.30 ”
Wednesday, ” 30	3.15 ”	6.15 ”	9.15 ”
Thursday, ” 31	4. 0 ”	7. 0 ”	10. 0 ”

December, 1884.	High Water.	Second Flood.	Low Water.
Monday, Dec. 1 ...	7.45 a.m.	10.45 a.m.	1.45 p.m.
Tuesday, ,, 2 ...	8.30 ,,	11.30 ,,	2.30 ,,
Wednesday, ,, 3 ...	9.15 ,,	12.15 p.m.	3.15 ,,
Thursday, ,, 4 ...	10. 0 ,,	1. 0 ,,	4. 0 ,,
Friday, ,, 5 ...	10.45 ,,	1.45 ,,	4.45 ,,
Saturday, ,, 6 ...	11.30 ,,	2.30 ,,	5.30 ,,
Sunday, ,, 7 ...	12.15 ,,	3.15 a.m.	6.15 a.m.
Monday, ,, 8 ...	1. 0 ,,	4. 0 ,,	7. 0 ,,
Tuesday, ,, 9 ...	1.45 ,,	4.45 ,,	7.45 ,,
Wednesday, ,, 10 ...	2.30 ,,	5.30 ,,	8.30 ,,
Thursday, ,, 11 ...	3.15 ,,	6.15 ,,	9.15 ,,
Friday, ,, 12 ...	4. 0 ,,	7. 0 ,,	10. 0 ,,
Saturday, ,, 13 ...	4.45 ,,	7.45 ,,	10.45 ,,
Sunday, ,, 14 ...	6.15 ,,	9.15 ,,	12.15 p.m.
Monday, ,, 15 ...	7. 0 ,,	10. 0 ,,	1. 0 ,,
Tuesday, ,, 16 ...	7.45 ,,	10.45 ,,	1.45 ,,
Wednesday, ,, 17 ...	8.30 ,,	11.30 ,,	2.30 ,,
Thursday, ,, 18 ...	9.15 ,,	12.15 p.m.	3.15 ,,
Friday, ,, 19 ...	10. 0 ,,	1. 0 ,,	4. 0 ,,
Saturday, ,, 20 ...	10.45 ,,	1.45 ,,	4.45 ,,
Sunday, ,, 21 ...	12.15 ,,	3.15 a.m.	6.15 a.m.
Monday, ,, 22 ...	1. 0 ,,	4. 0 ,,	7. 0 ,,
Tuesday, ,, 23 ...	1.45 ,,	4.45 ,,	7 45 ,,
Wednesday, ,, 24 ...	2.30 ,,	5.30 ,,	8 30 ,,
Thursday, ,, 25 ...	3.15 ,,	6.15 ,,	9.15 ,,
Friday, ,, 26 ...	4. 0 ,,	7. 0 ,,	10. 0 ,,
Saturday, ,, 27 ...	4.45 ,,	7.45 ,,	10.45 ,,
Sunday, ,, 28 ...	5.30 ,,	8.30 ,,	11.30 ,,
Monday, ,, 29 ...	6.15 ,,	9.15 ,,	12.15 p.m.
Tuesday, ,, 30 ...	7. 0 ,,	10. 0 ,,	1. 0 ,,
Wednesday, ,, 31 ...	7.45 ,,	10.45 ,,	1.45 ,,

When I first saw this strangely wild landscape I was struck at once with its unique grandeur and a medical fear that the horrors of malaria might mar its beauties to those dwelling in the valley. I therefore made most careful enquiries in all directions on this point, and I found that nothing approaching to ague or intermittent fever exists or has been known to exist in the neighbourhood. I was not surprised at this when I came to know of the peculiar double tide, which effectually prevents the possibility of the low lying flats reeking in the sun.

There are very few inhabitants at present in the higher reaches of Upper Parkstone; but some lovely country houses are to be found here and there, surrounded by extensive grounds; and others are beginning to be built at different elevations on the various plateaux among the pines, where, notwithstanding their altitude and free exposure to the sea front, on the south and south-west, they are still protected, on the north and east, by pine woods further back.

The character of the soil of the high ground may be seen in the photograph (Plate VI.) from my sketch of the back of Grandview Estate, Constitution Hill, where it has been cut down from time immemorial in order to uncover a valuable seam of pottery clay at the base, the hill itself being one gigantic mass of sands and gravels. (See Chapter VIII.)

In "Blackwood's Edinburgh Magazine," December, 1853, there was the following graphic description of this part of the country :—

"There are few more enchanting scenes in the south of England than the views across the harbour of Poole, from the high moorlands immediately to the eastward of Parkstone. On a sunny, though cloudy afternoon, the play of the lights and shadows is enchanting. Full in front, through the breaks in the pinewoods, and the rugged gaps in the furze-bushes that crest the falling ground, you gaze across an expanse of mirror-like water, shut in by headlands of various heights, and broken by islets that are sometimes densely wooded. 'The sandbanks,' where they catch the sunlight, are glowing in a golden light; a line of golden haze is floating here and there in the distance; while elsewhere the drift of the fleecy clouds is casting gray, diaphanous shadows across the sleeping waters. That Poole is still a 'harbour,'—though its ancient trade with our North American Colonies is decayed, and you might take soundings in most places with a yard measure—is shown by a lacery of masts and spars to the right. To the left these salt water lagoons are shut in by the bosky breakwater of Branksea Island, with its square towers of the mansion built by Colonel Waugh at one end—he subsequently was brought to grief by ruinous speculations—and the chimneys of some seemingly flourishing pottery works at the other. Beyond is the broad range of the Downs, or rounded 'barrows,' in the Isle of Purbeck;—while further away to the left the eye may rest on the gleaming blue of the Channel, dotted by the sails of ships, and flecked by the smoke of steamers. The general survey gives one a fair idea of the seductive variety of Dorsetshire landscapes. In some of the coast district we have the Scotch heather and firs. Inland, as you may see, is luxuriant forest timber, and there are lanes beneath these trees that remind one of Surrey. Immediately in front are samples of the Dutch flats. Beyond are bolder downs than we ordinarily find even in Sussex, though the Sussex downs seemed to Gilbert White a 'magnificent range of mountains.' And the back of the Purbeck Downs is escarped in stupendous chalk, which, with the rifts above, where the rabbits find refuge, and the dizzy ledges beneath, the nesting place of innumerable sea-fowl, drop straight down towards the depth of the ocean. These chalk cliffs culminate in St. Alban's Head—St. Alban is a corruption of the Saxon St. Aldhelm, First Bishop of the Diocese of Sherborne—which rises to a height of 450 feet. Near it is the scene of the wreck of the 'Halsewell' East Indian, one of those startling narratives of maritime disaster which figured conspicuously in a volume of 'Tales of Shipwreck' that thrilled and delighted our boyhood."

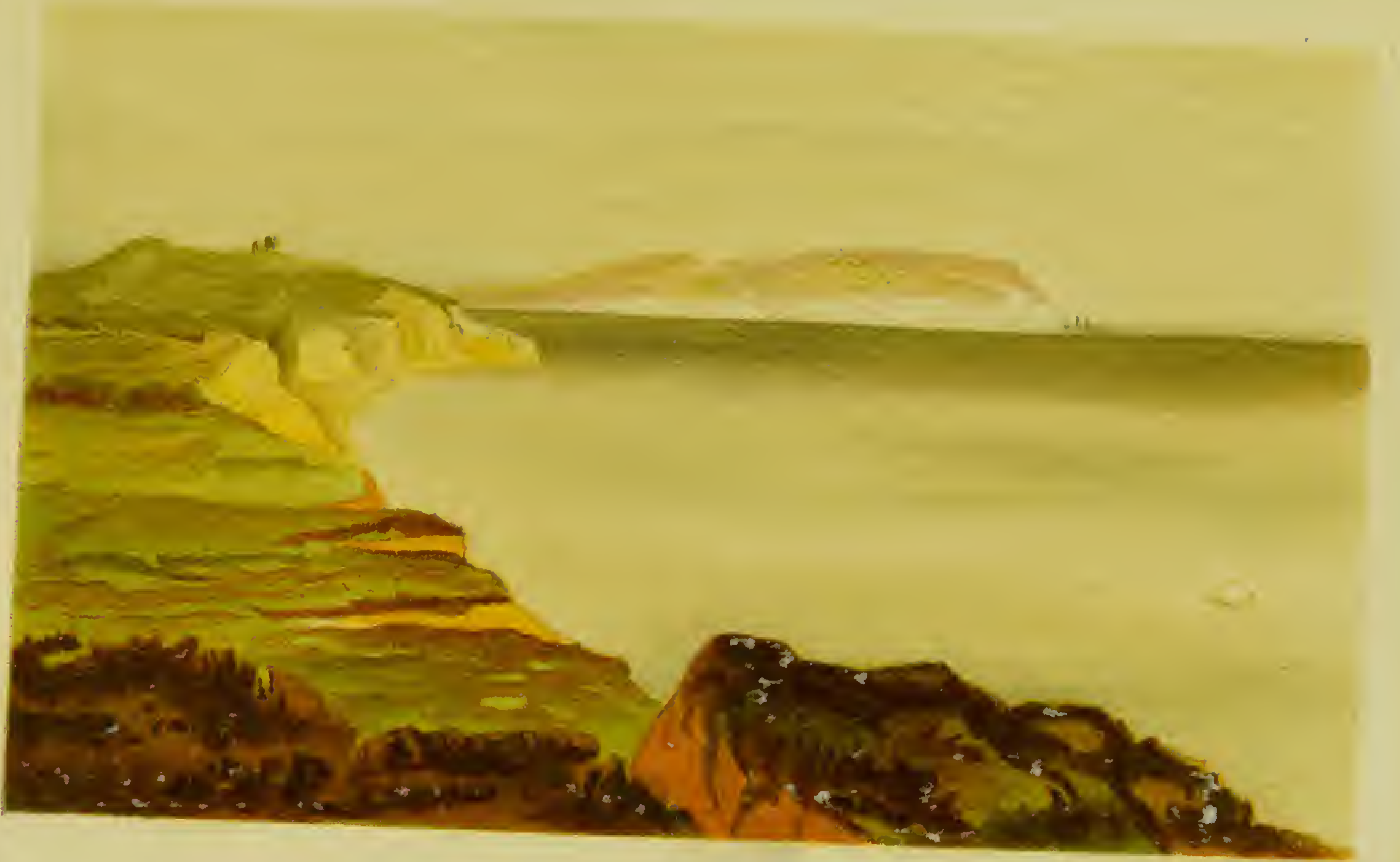
Of Parkstone proper, or Lower Parkstone, I have been favoured with the following note by Mr. J. R. Philpots (not Dr. Philpots, of Bourne Hall), who has long been the leading practitioner in the district:—

"Parkstone, commonly known as 'England's Mentone,' lies about three miles from Bournemouth. It contains 3,513 acres, which, according to the return to Parliament in 1801, contained 206 inhabitants. It now (1884) contains 2,000 resident inhabitants, besides numerous visitors, who come down to this healthy spot to avoid the cold of the winter months found in other parts of the country. It is protected on the north and east by a range of hills studded with pine trees. The prevailing winds are south and south-west, blowing over an extended area from the Purbeck Hills and Lulworth. The peculiarity of the tides—four in each twenty-four hours—keeps up a continual change of water in Poole Harbour, giving a freshness to the air of Parkstone even on the hottest day in summer. (See Tide Tables, pp. 212, 213.)

"Fogs are almost unknown, and the rainfall is much below the average. Although, in exceptionally hot summers, Parkstone may—for three months—be found trying to those who dread heat, it is less trying than many warm winter resorts, in consequence of the large amount of shade to be found under the fine oak trees with which its fields and lanes abound, and from the sea coming in to the wide expanse of land with four tides in twenty-four hours, as stated above.

"For nine months in the year no place can be more delightful, and during the winter it is especially suited to persons suffering from bronchitis and asthma. The soil being principally gravel and sand, acute rheumatism is almost unknown amongst the residents. There are no fevers, agues, or other endemic diseases, and no epidemic has visited the neighbourhood for ten years, except a mild form of measles and scarlatina, which once attacked an adjoining parish. The water is principally supplied by waterworks from distant springs, the great depth of sand rendering it impossible to sink wells capable of giving a constant supply to the householders.

"There are many beautiful walks, by the sea, in the woods and lanes, or over the hills, according to taste, which afford to those inclined for such pursuits plenty of opportunities of adding to their botanical, ornithological, or entomological collections. Owing to the peculiar sandiness of the soil, the lanes are rarely muddy, the rain quickly sinking away after a shower, and the roads are excellent for driving and



EASTERN RAIN-TRAPS.—HENGISTBURY HEAD AND THE ISLE OF WIGHT.—FROM THE CLIFFS, SOUTHBOURNE-ON-SEA, EAST OF BOURNEMOUTH, JUNE, 1885.

PLATE C. (*To face p. 217.*)

riding, while the towns of Poole and Bournemouth are within easy distance.

"There is a beautiful church (St. Peter's), with frequent and hearty services.

"A line of rail runs through the parish, with numerous trains to Poole and Bournemouth, and at the Parkstone station is a bookstall plentifully supplied with literature of all sorts wherewith to while away a wet day, or, in fine weather, to sit and inhale the health-giving emanations in the pine woods that lie between Parkstone and Bournemouth."

The climate of Lower Parkstone is more sedative than that of Bournemouth, and is out of the influence of the pines, while that of Upper Parkstone and Constitution Hill has more of the properties of mountain air; and although some parts consist of treeless heathland, in others there are numerous pine trees. These pine-clothed plateaux, with a climate combining the advantages of sea views, country surroundings, and modified mountain and marine air, form perfect sites for permanent residences, as well as for places of temporary change from Bournemouth.

SOUTHBOURNE.

The most important surrounding of Bournemouth, with a view to local change of climate, is Southbourne.

Swept from the front by the strong breezes of the whole expanse of the bay, combined with those coming up the Solent and from the Isle of Wight aspect of the Channel; swept from the back by the inland and fresh water breezes pouring up the wide valleys of the Stour and Avon; and looking down from its height upon the Christchurch estuary; the marine plateau which forms the site of the rapidly growing new health resort called "Southbourne-on-Sea," can never fail to have a free circulation of both land and sea air.

In the chromo-lithograph from my sketch (Plate I.), the furthest cliff on the left represents Hengistbury Head; and the next range of cliffs, on the Bournemouth side, forms the sea front of Southbourne, which lies between Boscombe and Christchurch. Boscombe is well wooded with pine trees, and, on the Boscombe side of Southbourne there are many pine plantations, while at Southbourne-on-Sea great activity has been shown by the promoters of the place in planting pines in all available spots. (See p. 67.) These are principally the *Pinus maritima* (or *Pinaster*) and the *Pinus austriaca*, the *sylvestris* not appearing to thrive at Southbourne so well as at Boscombe and Bournemouth. Many of these young trees have now attained considerable size and luxuriance, and, as I have pointed out in Chapter IV., the young trees, like the older ones, are able to afford to the air the important terebinthinate, camphoraceous, and antiseptic emanations, under the influence of sunlight and moisture, and Southbourne is specially favoured with regard to sunshine. (See Appendix.)

The following two cases will fairly illustrate the use that may be made, by Bournemouth patients, of the change of climate to be obtained so near at home by a removal to Southbourne-on-Sea. Following them (p. 223) will be found a brief account of the place by Dr. Davison, who, after practising for some years in a large smoky manufacturing city, where he became asthmatic, has now, in succession to Dr. Compton, become the chief practitioner at Southbourne, the climate of which has removed his asthma, and rapidly restored his health from the damage it had received in the former place.

Dr. Compton, who for many years has been a distinguished Fellow of the Meteorological Society, and has presided over one of its stations, kindly placed at my disposal his meteorological observations and experience of the Bournemouth district, and he has done the same for Dr. Davison with regard to Southbourne. (See Appendix.)

Dr. Davison, therefore, speaks with the combined authority of Dr. Compton and himself, and I am not responsible for his data, or for his conclusions from them.

Case XL. January, 1883. Lord —— wrote, asking me to come and see his wife, and saying, "Lady ——, æt. 60, is not suffering, at this moment, from any acute complaint; but she has a tendency to asthma and bronchitis and general debility, with weakened action of the heart. She has been at Bournemouth about six weeks without any marked benefit (except that *she has lost her bronchitis and asthma*), but on the contrary, with some tendency to increased weakness. When I saw the patient, a few hours after this message, I found her in bed and her husband and friends in considerable alarm, because she had become quite prostrate, and her hands, legs and feet had been getting colder and colder for half an hour in spite of attempts to keep up circulation. She was flabby and pallid, quite clear and collected, but very exhausted, pulse failing, and with a systolic thrill—respiration gasping. I detected a slight but definite systolic bruit under the manubrium and to the right side. Joints of fingers gouty; subject to uric acid gravel, urine now over acid; no albumen; family gouty on both sides. One brother died suddenly—supposed to be heart disease. She had had similar attacks of prostration before, one in Scotland very severe, two years ago, after a dose of morphia when suffering from uric acid gravel. Had lived in India, and although not having any definite climatic diseases, was much debilitated thereby. Habits very abstemious. Some hot whiskey and water soon restored her from this fit of sinking. On telling her husband the state of her heart, he said he had never been told that she had definite heart disease before, only that the circulation was weak; but the patient said that Dr. Sympson in Edinburgh had told her, ten years ago, that "she had a bruit," and Dr. Begbie confirmed it some time afterwards. I placed her upon restorative and anti-lithæmic treatment, and she improved to a certain extent, getting out daily in a chair or carriage, and she came to my house to see me in a week, having only had one slight return of "faintness and sickness," two days after my visit. Both the patient and her husband were strongly convinced that if she could be in "her Highland home" her prostration would leave her, but that the bronchitis and asthma would return. The season was such that any idea of return to Scotland was out of the question, but as their lodgings were in the lowest part of Bournemouth, near the sea, and only about forty feet above the sea-level, I advised a change to high ground farther from the sea. But Bournemouth was crammed full, and nothing suitable could be had. I therefore advised them to try Southbourne Hotel, as a suite of rooms could be got there, and the drive from Bournemouth was easy.

Lord —— wrote me:—"Drove to Southbourne yesterday. I think there is a difference in the quality of the air. It feels fresher and more bracing than it did where we were. It's a forlorn place, but the hotel is clean and well ordered." I went to Southbourne to see the patient a few days afterwards, and certainly there was a very marked improvement in her vital powers and spirits. I could not wonder at the words a "forlorn place," for it was during the one week of very bad weather which we had on this coast that winter, and the day I went to see them the wind and sleet were driving with such force from the sea against the front of the hotel that my coachman was obliged to move to the back of the hotel to prevent being blown off his box. Nevertheless the old people seemed rather to enjoy it, "it was so bracing;" and the next week, when the weather changed, and the place became *brilliant with sunshine from the fine broad expanse of moor and sea,* the description "forlorn place" was withdrawn; and all went well, till some business in the House of Lords obliged them to get near town. They went to Upper Norwood, the bracing air of which place suited the patient's debility but *not her chest,* and she wrote in

March;—"I was attacked very suddenly and severely with bronchitis, after being here a fortnight, and had recourse to your friend Dr. ——, who has very skilfully and kindly brought me through the illness, the study of your prescriptions and your letter having helped him materially, but I am still a prisoner in bed. Notwithstanding this attack I have felt no discomfort whatever about the heart. I think that *being five hundred feet above sea-level* keeps off that distressing feeling, aided of course by the remedies you gave me for so many weeks. . . . . I do really believe that 'hill-air' has become a necessity to me."

This case testifies to the invigorating qualities of the air at Southbourne-on-Sea, and to the convenience of having such a change available within a drive that can be easily taken from Bournemouth in all weathers. (See p. 161.)

Case XLI. May, 1883. Mrs. ——, æt. 29, came to consult me, from South Wales, in a very unsatisfactory state of general health. Hyperneurotic, with excessive sensitiveness of the chest walls, very feeble, and with signs of early phthisis in the upper part of the right lung, back and front, and a patch of recent pleurisy above the right nipple. Married twelve years; five children, all living but one. Cough since February, when she was suckling a child four months old, and had "congestion of the lungs, with free hæmoptysis." Three slight returns of hæmoptysis since. Her doctor wrote me: "Her case has been in many respects a difficult one. She has suffered in so many ways. She has had alarming hæmorrhage from the stomach, with all the symptoms of gastric ulcer, from which she has very slowly rallied. The chest symptoms have been of recent date. Her condition was so threatening that I urged on her the importance of getting change of air. I am very glad that you are able to give a (modified) favourable opinion."

I found no bacilli in the sputa, and by July the chest signs had so far yielded to treatment that they are described in my note as "nearly normal," and she had "no cough." The gastric symptoms had been very troublesome at intervals, and several recurrences of blood in the expectoration had appeared to be connected with disordered menstruation, which had now become regular. The point of the case is, for the present purpose, that, notwithstanding the important improvements in local disease, she did not get on in strength or general condition. I had not approved of her lodgings from the first. They were at a low level, (50 to 60 feet) in a sort of hole between two higher levels. (See list of Altitudes, p. 22.) The house was too full of people, and the cooking not so delicate as such a troublesome stomach needed. But the people were very kind, and the patient and her husband were "very comfortable," and did not like to move to any other house in Bournemouth. However, as the weather became very close, I insisted on their going to Southbourne. There she found the atmosphere more definitely stimulating, and she improved so much in general health that after a few weeks she went home in very fair condition, and I heard no more of her till August, 1884, when her doctor wrote: "Mrs. —— is going to Bournemouth next week to consult you. She has gone on fairly well during the past year, with occasional fluctuations, due to trouble with the digestive organs. As regards the condition of her chest, there is suspicious increase in the amount of expectoration, which of late has been frequently blood-stained. I cannot find evidence of breaking down, but I shall be glad to know your opinion of her condition. She is about two months pregnant."

I advised that on this visit she should select high ground, and secure good cooking, which she did at 130 feet above sea level. My note says: "No disintegration signs, but the right upper continues defective in resonance, especially towards the sternum, and breathing is harsh." Sputa examined, and no bacilli or *débris* of air-cells found. She got on admirably, and went home "quite plump." Her doctor wrote: "Her visits to Bournemouth do her a double benefit, improving her physical condition and sending her home in good spirits."

This case again well illustrates the importance of selecting for different cases different situations in Bournemouth or its surroundings, and the advantages of having such different positions within easy reach of each other, so that changes can be readily made. (See p. 161.)

NOTE ON SOUTHBOURNE-ON-SEA.

BY J. DAVISON, M.D. (See p. 218.)

"Southbourne-on-Sea is a recent and rapidly rising health resort, situated towards the eastern extremity of Bournemouth Bay, with a full southern exposure to breeze and sunshine. The site of this new watering place is virtually a small table-land of about 100 feet elevation, and standing raised above the very margin of the sea.

"The soil is of the driest possible character, consisting of sand and gravel to a considerable depth, and beneath the gravel are the Bagshot Beds of the geological survey; these middle Eocenes being continuous with those of the rest of the Hampshire Basin, and with the Eocene strata of Alum Bay and the western extremity of the Isle of Wight. (See Chapter VIII.)

"The proprietors of Southbourne-on-Sea, in making the roads, and laying out the land for building purposes, have paid much attention to sanitary matters, and have fully availed themselves of the natural advantages which the place presents, not only for residences for healthy people, but for sanatoria for invalids.

"The building sites and roads are so arranged that most of the houses shall have a southern aspect, and picturesque fences of gorse and heather shelter many of the lanes and avenues. A great number of roads are also lined with pine trees, and the land generally is abundantly covered with heath, furze, and evergreens; and several of the sites have been ornamentally planted with green shrubs, and with the several species of conifer, which form so marked a feature in the district of Bournemouth and its surroundings. (See Chapter IV. and p. 218.)

"AT PRESENT THERE IS IN COURSE OF RAPID CONSTRUCTION AN UNDERCLIFF SEA WALL AND ESPLANADE, which when completed will form a magnificent drive and promenade. From the manner in which this work is being advanced it is expected that the esplanade will be opened to the public in a few weeks. Southbourne-on-Sea, although still in its infancy, will then possess the first and only promenade esplanade in Bournemouth Bay. Villa residences are about to be built on this undercliff esplanade, where those invalids, who are unable to bear the more bracing air of the table land, can reside during the winter months, absolutely protected from the east, north, and north-west winds, yet fully exposed to the south, so that they will be able to enjoy the full benefit of the sunshine and winter warmth, hitherto not made available anywhere on our charming coast.

"The climate of this diminutive plateau is remarkably healthy, and partakes generally of the special characters common to the high ground of the whole of the Bournemouth seaside locality, with some distinctive features peculiar to itself. The air is exceedingly pure, dry, and bracing; the temperature equable,—cool in summer and mild in winter—and the rainfall moderate. Moreover, what is perhaps of greater importance to the welfare not only of invalids but of healthy people than any other meteorological advantages, there is a much greater absence of cloud than in most places, and consequently an unusual abundance of sunshine. The registrations of 'Campbell's Sun Recorder' at Southbourne-on-Sea for the past five years prove the locality to be one of the sunniest spots in England. The dryness of the air of Southbourne, notwithstanding the close proximity of the place to the sea, is no doubt due to the excellent absorb-ing qualities and perfect drainage of the soil. The surface is quite dry almost immediately after rain, even in the depth of winter—a great advantage to residents and visitors generally, but especially to invalids who come south on account of health.

"The night temperature, which is so important a point in the climatic treatment of disease, is found by registration to be lower in the valleys than on the adjoining high lands throughout the whole of the Bournemouth district; and the minimum night temperature of the Southbourne table-land is similar to that observed on the higher parts of the East Cliff at Bournemouth.

"The coolness of the atmosphere in summer is due, undoubtedly, to the pleasant freshness of the invigorating sea breeze, which usually sets in about 10 a.m., and lasts until the middle of the afternoon. (See p. 153.)

"As compared with Bournemouth, the climate of Southbourne-on-Sea will be found cooler and much more bracing in summer; drier, and, towards the eastern aspect, slightly colder in winter than the more sheltered portions of the East Cliff at Bournemouth; while it has fully 10 per cent. less rainfall than Bournemouth at all times of the year, as shown by the comparison of registrations for the past seven years. On the other hand the climate of the Undercliff at Southbourne, soon to be made available for residential purposes, is naturally very much warmer than that of the cliff above, and warmer than any part of Bournemouth, whilst during the summer the air, although less bracing than on the table-land above, is never hot or relaxing, owing to the sea breeze above referred to.

"The higher table-land air of Southbourne is, perhaps, less suited in winter for very great invalids than that of the Southbourne Undercliff; but it is much more desirable for those who, requiring a very pure air, can stand a more bracing atmosphere. The higher locality is of great value in cases of phthisis in its incipient and earlier stages, in chronic bronchitis, emphysema, and dyspepsia; also for all convalescents from acute illness, and for those who suffer from any mental or bodily depression. It is specially efficacious in asthma, in diseases of the liver, particularly in the affections of this organ and the maladies generally from which Europeans suffer during a prolonged residence in India and other tropical countries. (See Chapter III.) It will be found of much benefit for delicate children, especially for those born in India and hot countries, who have here all the advantages of a mild southern sea-side climate combined with the purest table-land air, the driest soil, abundance of sunshine, and plenty of space for recreation either on the beach below or on the sandy heather-covered land above.

"THE UNDERCLIFF, on the other, hand is *par excellence* the place of residence for those who require a strongly marine atmosphere and a much protected aspect, or, who find the bracing air of the plateau above too strong for them. Here, in a charmingly sheltered position, commanding lovely views of the Solent and Isle of Wight on the east, Swanage Bay and the Purbeck hills on the west, the invalid will enjoy a winter climate warmer than is as yet to be found in any other part of the neighbourhood, combined with facilities for walking and driving on a perfectly level esplanade, and sheltered completely from the northerly winds. It, therefore, cannot fail to afford a most salubrious residence to persons who, are unable to take efficient exercise in a hilly neighbourhood without pain and discomfort.

"Quite lately, when sinking a deep foundation at the base of the cliff, the workmen employed on the esplanade works discovered a mineral spring, of which the following analysis has been made; and Dr. Herman Weber has expressed the opinion that 'small quantities much diluted are likely to act beneficially in many cases of anæmia.' So that an important medicinal element is added to the existing valuable therapeutic advantages found at Southbourne-on-Sea."

"REPORT on a Sample of WATER taken from the Chalybeate Spring, West Parade, Southbourne-on-Sea.[*]

"The water was clear when received, but after opening the bottle, it gradually deposited basic sulphate of iron. In reaction it was acid.

ANALYSIS.

			Grains per gallon.
The total solid residue dry at 100° C. amounted to			275·00
Loss on ignition of residue	,,	,,	44·96
Chloride of Sodium ($NaCl$)	,,	,,	19·16
Sulphate of Sodium ($Na_2 So_4$)	,,	,,	56·75
Sulphate of Calcium ($CaSo_4$)	,,	,,	13·72
Ferrous Sulphate ($FeSo_4$)	,,	,,	33·49
Ferric Sulphate ($Fe_2 3So_4$)	,,	,,	65·80
Ferric Oxide (Fe_2O_3)	,,	,,	5·40
Sulphate of Aluminium ($Al_2 3So_4$)		,,	27·47
Silica (SiO_2)		,,	6·75
			273·50

"Nitrates, Nitrites, Potassium, and Magnesium were present only in traces. The water contained no free ammonia, and the albuminoid ammonia amounted to ·05 parts per 100,000.

"This water is strongly Chalybeate in character, and if administered subject to medical advice, could be advantageously employed medicinally.

C. T. KINGZETT, F.C.S., F.I.C.

Member of Council and a Vice-President of The Society
of Public Analysts; late Member of Council
Institute of Chemistry, etc."

CHRISTCHURCH.

This old-fashioned, countrified town, with its noble Priory Church, so interesting to antiquarians and archæologists from the variety and beauty of its architecture; with its impetuous "meeting of the waters" of two salmon-rivers as they rush down to the sea; with its Roman ruins, its ancient bridge, and its view of Hengistbury Head; is only introduced in this book because it has the reputation in the district for having a climate strikingly different from Bournemouth and its other surroundings (see p. 161), rendering it, together with its fishing, boating, and archæological attractions, a valuable outlet, especially in the summer, for persons who feel Bournemouth too warm, or who have got tired of its immediate associations and wish for a change, without "going far-a-field." To many persons, the quiet, old-world characteristics of the place, and the exquisite river scenery, to be found by following the windings of the Avon and the Stour inland, have great charms, and exercise a calming influence on the nervous system; while the abundance of fresh water flowing with tremendous rapidity through the long stretch of flats gives a cooling and refreshing quality to the air.

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[*] See also a Paper by Mr. Kingzett, read before the Society of Public Analysts, December 17, 1884, and published in the "Analyst," Feb., 1885.

I have made careful enquiries as to the possibility of malaria from the often flooded fields, and from the broad estuary. Dr. Mead, the medical officer of health and medical officer to the Infirmary, who has great experience in the district, tells me there is no endemic disease, and he has kindly submitted to me his reports to the Christchurch Rural Sanitary Authority for the years 1881, 1882, 1883, and his reports of the cases admitted into the Workhouse Infirmary, all of which confirm his statements, and chiefly impress one with the large number of old persons resident in the district.

The death rate for 1881 was 15·8 per thousand.
" " 1882 " 18·2 " "
" " 1883 " 15·77 " "

The birth rate for the three years was—

1881.	1882.	1883.
35·3	35·5	37·3 per thousand.

I am also permitted to print the following interesting notes by Mr. G. Brownen, Fellow of the Chemical Society, who, although practising his profession in London, was born and brought up in the Christchurch district, and always spends some part of the year among his old associations, so that he is qualified both practically and scientifically to speak about it.

"In accordance with my promise to you, I now send you the following notes upon the Christchurch District, which I have been able to collate from various sources.

"The coast line from Lymington to Christchurch, Bournemouth, and from thence across the mouth of Poole Harbour to Studland and Swanage, forms an arc of geological interest, having as a base a bed of pottery and fire-clay; above it a seam of earthy brown coal, occasionally broken by a deposit of blue marl, and overlaid by alum and copperas shale, fire-clay and white sand. North of this district, and also north-east of Christchurch, occur beds of clay and sand, and these deposits extend for miles along the course of the River Stour; and in the more elevated portions on the western bank of the Stour, and at Boscombe occur masses of ironstone, cement stone, etc.

"The beds immediately below the soil upon the New Forest side belong to the Tertiary formation, and rest upon the chalk, and nearly all the strata are visible in a vertical position in Alum Bay in the Isle of Wight. The dip is to the south, and seen from their vertical sections in Alum Bay to be about 600 feet thick; these sands contain layers of pipe-clay and ligneous remains.

"Upon the eastern side, at Hordle, the cliffs are about 180 feet high, capped with broken flints 5 to 50 feet thick; the cliffs frequently fall in large masses, from the action of springs. In the blue clay of the Barton cliffs are found several hundred varieties of shells; and in a bed, ranging from 20 to 50 feet thick, of fresh water deposits of marl, sand, and clay, are found the fossil remains of lizards, crocodiles, alligators, birds, chelonians, and other extinct animals. Lignite in several places occurs here at the top of the cliffs Between Barton and Highcliffe occurs a deposit of green clay, containing sharks' teeth and bones of fish. The Highcliff Sands and pebble beds now rise, and give place at the next chine or bunny to the grey sands, with sand and ironstone; and a little further on, near Mudeford, the Bracklesham Sands lead to the alluvial deposits and sands of the Christchurch Haven.

"Crossing the 'run' of the united rivers Avon and Stour we find a shifting sand-bar, resting chiefly upon iron-stone, terminating in the headland called Hengistbury or Christchurch Head about 120 to 140 feet high. This hill consists of five layers of ironstone, and is really the only point between Lymington and Poole where large masses of stone may be seen. From this point onwards to Bournemouth the cliffs are of the Tertiary formation, capped with flinty gravel, and near the sea level there is occasionally ironstone. The gravels covering the higher table-lands are supposed to have a higher antiquity than the valley gravel of the rivers, which were probably deposited after the severance of the Isle of Wight from the mainland; St. Christopher's Cliff upon the opposite shore of the Isle of Wight, looks as if it had been rent away from the mainland at Hengistbury Head. Tradition records their severance as a fact; and it is said that a bridge of chalk, and a bar of hard sand 200 yards broad actually unite these two points.

"On the east of this line, in the Eocene period, is supposed to have rolled an inland sea the waves of which reached the Wiltshire hills, until it was diverted into another course by the volcanic action which severed the Isle of Wight. It is also supposed that the Avon and Stour are the modern representatives of a larger river, which formed an estuary opening into the sea in the direction of Spithead.

"The western river, the Stour, draining a considerable portion of Dorsetshire, enters Hampshire at West Parley. Its bed is principally stiff clay, table-lands confine and direct it for some distance, but its valley widens out below Holdenhurst, more especially to the east. The Avon rises in Wiltshire, and enters Hampshire above Fordingbridge. Its bed is chiefly gravel, and it lies in a wider valley than the Stour, and shows more alteration of its course by the deposition or removal of alluvium, especially noticeable below Ringwood and nearer Christchurch.

"Until Christchurch is reached, the Avon is divided from the Stour by a gravel ridge of an undulating character, narrowing in width towards Christchurch, and obtaining its highest elevation at Ramsdown and Catherine Hills, about two miles north of Christchurch (see p. 14); the ridge then abruptly falling to an elevation of a few feet above high water mark, takes a southward direction and carries upon its centre the Herne Road and the High Street, Christchurch, as far as the Priory Church. This ridge ends just beyond the Priory grounds; the two rivers Avon and Stour then unite and flow together into the harbour beyond.

"Christchurch itself chiefly rests upon a bed of gravel (ferruginous) lying chiefly upon white sand and clay, but the meadow lands upon either side of the town are fresh water deposits, and peaty (see p. 41). From these circumstances the river and well waters of Christchurch show considerable differences; thus, a shallow well in a peaty situation gave—

Hardness, Clarke's scale		8°
Total solids	per million	159·0
Free ammonia	"	·02
Albuminoid ditto ...	"	·09

Another well, which, by the way, had corroded lead, gave—

Hardness, Clarke's scale		6°
Total solids	per million	119·0
Free ammonia	"	·03
Albuminoid ditto ...	"	·05

A deeper well contained iron and alumina, and the results of its analysis were—

Hardness, Clarke's scale		13°
Total solids	per million	217·0
Free ammonia ...	"	·04
Albuminoid ditto ...	"	·09

This water, subsequently purified by clearing out the well, gave—

Free ammonia	·02
Albuminoid ditto	·05

"Waters ranging from 13° to 23°, Clarke's scale, may be obtained in the town of Christchurch; from 4° to 14° in the villages adjacent to the rivers above Christchurch; from 13° to 26° at Stanpit and Mudeford; one spring at Stanpit has a mediæval fame as a good water and curative agent (monkish specific for blindness). It is a soft, shallow, wayside well.

"Ferruginous springs occur at Hengistbury Head, Southbourne, Pokesdown, Boscombe, etc.

"Wells driven into the fossiliferous clay are phosphatic, and the water soon becomes offensive. Forest brooks, feeding chiefly the Avon, contain traces of iron, and also deposit an ochreous, peaty substance along their courses.

"The Priory churchyard is practically below the town, and between the town and the rivers; and the cemetery is about equidistant from the town and the river; the tombstones in the churchyard often show ages of 80 and 90, and in the Congregational burial ground is one giving an age of 112.

"The southern walls of the Priory church and its glass windows show considerable etching, from its proximity to the sea; and I have found Schonbein's ozone reaction (iodide of potassium and starch paper) on Catherine Hill, at Roeshot, Stanpit, and near Ringwood.

"The chief features of the Christchurch District may be determined by its gravelly soil, its great river drainage, and its valley-like position enclosed by low sand hills.

"The time may come when an efficient and uniform water-supply may be deemed desirable at Christchurch; a splendid natural supply awaits their storage upon Catherine Hill, in the sand and gravel, at an altitude of about 100 feet, within two miles of Christchurch, and in a straight line with the principal street.

"Drainage, apart from the rivers and independent action, may prove a more difficult business. Both rivers are good fish rivers (salmon and trout), and therefore not much polluted by sewage at present."

In the following case the patient, who was devoted to fishing, certainly got no harm from the river air of Christchurch, although he spent more time there and often remained later in the evening than I thought wise or safe. But, wanting amusement during convalescence, he engaged a punt and fisherman at Newlyn's Hotel and drove over to lunch every fine day and spent the afternoon fishing, returning to Bournemouth to a late dinner. To try and appease my anger at his indiscretion, he sent me many trophies of the excellent sport he had enjoyed. His own opinion was that the Christchurch air had much to do with his rapid restoration to health, after the local disease had yielded to medical treatment and Bournemouth air, in which he still spent his nights and mornings, and all days not fine enough (see p. 161) for Christchurch. At all events it made him very happy when otherwise he might have been dull away from his friends, for he was a widower and accustomed to much society.

Case XLII. Mr. ——, æt. 38, had suffered from recurrent attacks of bronchitis with blood-stained sputa *containing plastic casts of the bronchi.* Had been to Mont Dore, Auvergne, and to Arcachon, where he quite lost his complaints, but had a sudden relapse on returning to London. He consulted me August, 1883, having come to Bournemouth with an attack of bronchitis, and just brought up a small cast with blood-stained sputa. Muscular development excessive, from former athletics. Heart losing power from recent sedulous and luxurious life; general health described as "excellent," but thought to be disposed to gout, and his urine contained uric acid crystals in specimens examined. The only morbid chest sounds were those of bronchial catarrh, with very large rhonchi in the right bronchus; no pressure signs. Father died of cancer of the bowels; no other family complaint. His doctor wrote: "I never had a case of the sort before which proved so persistent, but I suppose no one person has had a very large experience of this disease, as it is comparatively rare." I ordered a Siegel's spray inhaler with a solution of biborate of soda and glycerine to be used twice a day, and anti-lithæmic treatment internally. Next day the patient wrote "I am sorry to say that to-day, about two o'clock, I threw up a big cast, which I now send you in a bottle. I had no difficulty in throwing it up, and do not feel any the worse." This cast was a very typical one, shewing, when suspended in water, several large bronchial ramifications. It was of India-rubber-like consistence. When squeezed between glass and examined with the microscope it presented abundant mucous corpuscles and epithelium cells, and a number of crystals of a calcium salt were scattered through the mass—the fluid part of the expectoration contained in suspension a number of the same crystals and cells. No bacilli, no air-cells. The biborate of soda spray was freely used, and all bronchial signs yielded in a few days—except a flapping rhonchus in the right bronchus, from which I suspected that another cast was lodged there; and this proved to be the case, for, in a day or two, a large very tough cast with several branches was expectorated. After this the rhonchi disappeared, his voice which had been hoarse became natural, and he quite lost his cough. He had no more expectoration; but I advised a continuance of his spray and anti-lithæmic treatment as a preventive of further attacks. It was soon after this that he took to the fishing at Christchurch, referred to above, without causing any relapse.

I may mention here that from the excellent recovery made by Mr. —— he was induced to send a little nephew to school at Bournemouth, who had given great anxiety from his liability to frequent attacks of bronchitis. (Case

XLIII.) I examined the boy when he came down, and found general bronchial thickening of the naso-pulmonary mucous membrane with chronic catarrh; he was over fat and considerably oppressed in breathing by his chest difficulty, and I learned that this was his usual state, aggravated every now and then by fresh colds. He was placed under medical treatment for a few weeks, with marked success; and so beneficial has been the influence of the climate that from that time he has not required any serious medical treatment, having continued free from catarrh all last winter and throughout the year 1884. (See Chapter VI.)

CHAPTER VIII.

THE GEOLOGY OF BOURNEMOUTH AND ITS SURROUNDINGS.

In preparing the diagram of the Cliff-line from Hengistbury Head to Poole Harbour (Plate VII.), I have been assisted in ascertaining the exact measurements from point to point by Mr. C. W. Rebbeck (Estate Agent), and Mr. H. E. Hawker (Architect and Surveyor). The longitudinal scale of one inch and a half to the mile is as nearly correct as possible. The vertical scale is purposely exaggerated in order to show the irregularities of the cliffs without needlessly enlarging the diagram. The exact altitudes of the chief points will be found in the following pages, and in Chapter II., pp. 22, 23.

The statements contained in this Chapter are chiefly compiled from the following sources.

1. A paper " On the Superficial Deposits of the South of South Hampshire and the Isle of Wight. By Thomas Codrington, Esq." Quarterly Journal of the Geological Society, Nov. 1, 1870.

2. " A Description and Correlation of the Bournemouth Beds. Part I. Upper Marine Series. By J. Starkie Gardner, Esq., F.G.S." Quarterly Journal of the Geological Society. May, 1879.

3. " Description and Correlation of the Bournemouth Beds. Part II. Lower or Freshwater Series. By J. Starkie Gardner, Esq., F.G.S." Quarterly Journal of the Geological Society. February, 1882.

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4. "On the Lower Bagshot Beds of the Hampshire Basin. By J. Starkie Gardner, Esq., F.G.S." Proceedings of the Geological Association. Vol. V., No. 2.

5. "British Eocene Flora. By J. Starkie Gardner, Esq., F.G.S., and Constantine Baron Ettingshausen, Ph.D." Palæontographical Society, 1879.

For those readers unfamiliar with geological phraseology I may note that the term cainozoic or tertiary time (*kainos* anglicized *cæne* or *cene* new) refers to the fact that it is in tertiary or cainozoic rocks that we *first* find traces of fossil organisms identical with living ones. These tertiary rocks are then divided, according to the proportions they contain of such fossils, into—

EOCENE (*Eos* the dawn, *cene* new), the dawn of new organisms.

MEIOCENE (*Meion* less, *cene* new), less new than old organisms.

PLEIOCENE (*Pleion* more, *cene* new), more new than old organisms.

PLEISTOCENE (*Pleiston* most, *cene* new), new organisms, about 95 per cent. This includes the glacial and recent periods.

In a letter to me, October 14, 1884, Mr. J. Starkie Gardner thus summarises the character of the soil of Bournemouth :—

"The subsoil at Bournemouth is, practically, clean, siliceous sand, uncontaminated even with fossil organisms. On the east the sands extend to the river at Christchurch, and *no clays whatever come within, I should think, fifty feet of the surface.* On the west there may be an occasional but very slight outcrop of clay near the surface, here and there, but, as a rule, the patches of clay are small and deep down.

"You would be perfectly correct in describing it as a formation of clean quartzite sand, similar to that on Bagshot Heath, with no mixture of clay on the East Cliff, and very little on the West, until Poole Harbour is reached." (See p. 25.)

With regard to the geological age of the changes referred to in his paper "On the Lower Bagshot Beds of the Hampshire Basin," Mr. Starkie Gardner says: "The great changes in the flora which I shall mention to you, although principally due, perhaps, to the great change of level of which we have other indications, *may also indicate long lapse of time*—long enough, as I have said, for the marine fauna of Bracklesham—to develop—to disappear—and to give place to that of Barton.

"I do not know whether we shall ever be able to estimate geological time, but astronomers tell us that a cold period recurs about every 26,000 years, and it seems to me to be probable that we may get some data in this direction on which we may build our hypothesis.

"In the English Eocene we appear to have the deposits of a *cool* period, as shown by the mollusca of the Thanet sands. The plastic clay may represent a *cold* period, the London clay indicates, as we all know, a *hot* period, becoming cooler in the lower Bagshots, and again reaching a tropical character in the Bracklesham beds epoch. The overlying Barton beds indicate a slightly cooler condition, again becoming tropical in the Headon beds of Hordwell; the Bembridge and Hempstead beds show a decreasing temperature, quite temperate at the top of the latter. In the Miocene, Heer has ascertained that there was an increasing temperature."

Referring to the same subject, "Daphnogene" wrote, in "The Bournemouth Visitors' Directory," "In reply to the question of 'Enquirer' . . . respecting the age of the fossil leaves of the Bournemouth cliffs, I may briefly remind him that, although the sands and clay containing them seem to lie horizontally, such is not really the case; on the contrary these sand and clay beds have an inclination or dip to the eastward. But I must here caution 'Enquirer' against confounding the said sand and clay beds with the yellow gravel of the cliff top. The latter is altogether distinct from the former, and was deposited long after them. If we follow the Bournemouth sands and clays eastwards along the beach, we find that at Hengistbury Head they dip under another series of beds, and are thence lost to sight. These over-lying, and therefore obviously more recently deposited, beds are known geologically as the 'Bracklesham Sands,' *while the sands and clays of the Bournemouth cliffs belong to the Bagshot series.* These together form the middle section of the lowest (or oldest) division, called the Eocene, of the tertiary formation. . . . So much to identify the place in the great geological series of our Bournemouth cliff strata."

Before proceeding with Mr. Gardner's account of the cliffs, and of the fossils which they contain, we will consider the gravels which are spread over the upper surface. These have been investigated by Mr. Codrington, and the following statements are taken from a paper " On the Superficial Deposits of the South of South Hampshire and the Isle of Wight. By Thomas Codrington, Esq. Quarterly Journal of the Geological Society, November 1st, 1870."

The district of which Mr. Codrington treats is comprised between Poole and Portsmouth, and extends inland to Wimborne, Downton, Bramshaw, Romsey, and Bishopstoke ; it also includes the Isle of Wight.

Tertiary formations occupy the whole of the area, with the exception of the southern part of the Isle of Wight; and the surface is very generally covered with the superficial deposits, which are the immediate subject of this paper.

The physical features of the country and its superficial deposits are so closely connected that they must be considered together. The New Forest and the neighbouring country between Poole and Southampton Water, is characterised by high level plains, very generally covered with gravel or brick-earth. On closer examination these plains are found to be portions of a table-land, with a very gradual southern slope, through which the larger rivers flow in well defined valleys, and which has been a good deal cut up, and over large areas entirely removed, by the action of tributary streams flowing in what are locally called the "bottoms." The extension inland of the table-land is best seen on the east of the Avon, where it can be followed from the coast northward for upwards of twenty miles to a gravel-capped escarpment 420 feet above the level of the sea, and 200 feet above the ground immediately to the northward, extending from Downton Common to Bramshaw. Near Highcliff, two miles east of the mouth of the Avon, the cliff is 96 feet high, and is capped with 18 feet of gravel.

A section of the gravel covering the table-land is seen in the cliffs between Poole Harbour, and the entrance of the Solent. Westward of Poole Harbour there is no gravel on the coast, though a patch occurs at a high level in the valley of the Frome near Rempston House ; but between Poole and Bournemouth the cliffs are capped with gravel at from 100 to 120 feet above the sea. It is from this gravel that the flint instruments found on each side of Bournemouth are derived.* The general level of the table-land near the coast at Bournemouth is about 120 feet above the sea, and, except where it is intersected by the Bournemouth Valley, or by chines, the gravel bed is continuous and from 8 to 15 feet thick, to within about a mile from the mouth of the Avon; there the table-land ends, and a cliff not more than 10 or 20 feet high is composed of what appears to be the gravel beds of an old channel of the Avon or Stour, which reach as low as high water mark. Between them and the present mouth of the river,

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* Mr. Codrington, in his summary, concludes that the flint implements of Bournemouth and Southampton Common are from gravel, covering table-lands at elevations corresponding to the high-level valley gravels of Alum Chine, and that the flint implements of Bournemouth show that the upheaval there has been as much as 120 feet, and the implements in the gravel on Southampton Common that it has been there as much as 150 feet since the appearance of man.

Hengistbury Head rises to 120 feet, and is capped with the older gravel. In Barton and Hordwell Cliffs the thickness is now as much as 18 to 20 feet.

The chines in the sandy cliffs to the westward of Bournemouth furnish many sections in which the relations of the older valley and the chines with the gravel covering the plain can be observed. In Alum Chine (Plate II.) a bed of gravel and the overlying brick-earth have been cut away by the older valley, on the side of which lies a bed of white gravel over-lapping the edges of the brick-earth and the lower gravel. The chine itself has cut through the white gravel.

The gravel varies but little in character or composition over the area which has now been described. It consists almost exclusively of chalk flints, little rolled and often perfectly fresh. There is always, however, a proportion of tertiary pebbles; and where, as between Bournemouth and Christchurch, extensive pebble beds occur in the underlying tertiary strata, the proportion of pebbles in the gravel is considerable.

Fragments of Sarsen, or grey-wether sandstone, are met with every where. A block of pudding-stone, part of a larger mass, which is stated to have come from the gravel of Hordwell Cliff, is now in the Jermyn Street Museum. Mr. Godwin Austin has recorded the presence of water-worn specimens of white quartz, granite, and porphyry in the gravel on the high plain a little to the east of Poole, at about 160 feet above the level of the sea (Plate V.), and white quartz pebbles certainly occur as far east as Lymington. Brick-earth of a sandy nature is generally interstratified in this gravel in lenticular seams, and sometimes overlies it.

The general character of the gravel is a deep red-brown; there is, however, a white gravel (so known locally and distinguished from the red or binding gravel), which is often met with and deserves some notice. It generally overlies the red gravel, and penetrates it in "potholes" and "pipes." It is loose and sandy, and the flints in it are white with a curious porcelain-like lustre; the sandy matrix is sometimes dark with vegetable matter, and there is often a black carbonaceous band between the white gravel and the red.

Mr. Codrington believes that generally the white gravel has been formed *in situ*, and that its origin is due to the bleaching action of water, holding organic matters in solution, upon the red peroxide of iron by reducing it to a soluble protoxide in the way pointed out by Bischoff. The pipes of white gravel penetrate the red, and the black carbonaceous bands separating the two gravels are usually full of root fibres. Where, as in some sections, the white gravel seems to be interstratified in the red, it is probable that an unseen "pipe" communicates with a more sandy and porous seam, which has been bleached, while the less porous gravel over it has been unaffected. In some instances however, it appears as though the white gravel were subsequently deposited.

In the chines or "bunnies" to the west of Bournemouth there are sections, at right angles to the coast, shewing the red gravel, with brick-earth over it, ending against a slope of Bagshot sand on the land side, and throwing out towards the sea, so that the white gravel, which overlies both, overlaps the brick-earth and rests directly on the red gravel, reduced to less than half its thickness in the sea face of the cliff. In the east side of Alum Chine the white gravel is seen overlapping both brick-earth and red gravel, and resting directly on the Bagshot sand. These appearances, however, are not inconsistent with the supposition that the white gravel is contemporaneous with the red, and has been bleached in the way above noticed in consequence of its porosity.

The gravel varies much in thickness. In the railway cutting one mile south of Wimborne, through a plain 176 feet above the sea, the gravel is as thick as from 25 to 30 feet Where the junction of the gravel with the underlying formation is exposed in long sections, it is seen to be much more irregular than the surface. There is an instance of this in the railway cutting near Wimborne, and in that through the level plain between Christchurch and Bournemouth, where the gravel varies from 2 to 12 feet in thickness in 20 yards. In the cliff sections similar variations are observable; but the average thickness there, and in the gravel pits in the neighbourhood, is about 10 feet.

Flint instruments have been found in the tabular bed of gravel capping the cliffs near Bournemouth at 120 feet above sea level. (See foot-note, p. 240.)

Mr. J. Starkie Gardner, in his first paper ("Description and Correlation of the Bournemouth Beds, Part I. Upper Marine Series"), says that his object is to prove that *the Bournemouth leaf-beds immediately underlie the Bracklesham series, and are, unlike that of Alum Bay, of middle and not lower Bagshot age*, as he believes had been hitherto supposed. He has ascertained that a great portion of the cliffs between Christchurch—or Hengistbury—Head and Bournemouth are of marine origin and highly fossiliferous.

As the beds richest in fossils are the sandy-clays and clays, and as it is these which chiefly interest Mr. Gardner, they are naturally given the place of honour in his paper; whereas geologically they are of very limited extent, as compared with the sandy shingles and gravels, as will be seen by Mr. Gardner's letter to me, quoted at pp. 25 and 237, and by Mr. Codrington's observations in this chapter. (pp. 239—43.) It is necessary to bear this in mind to prevent misapprehension as to the character of the soil of Bournemouth, because the FOLLOWING SECTIONS HAVE BEEN SELECTED ON ACCOUNT OF THEIR FOSSILIFEROUS IMPORTANCE, AND REPRESENT THE CLAY BEDS PAR EXCELLENCE:—

Section I.

HIGHCLIFF SANDS, at Highcliff nearly under Rothsay Castle, (*East of Christchurch*)—

		Feet.	In.
BARTON ...	Coarse, green, sandy clay, with grains of quartz	0	8
	Indurated marly clay with "tabular soft septaria"	0	7
	Dark green, coarse sandy clay ...	9	0
BRACKLESHAM.	Pebble-bed towards the W., changing E. into soft dark sandy clay, with scattered pebbles and impressions of fossils	1	6
	Sandy clayey at bottom, very variable W. There is a band of ironstone-septaria in these sands which is not persistent ...	33	0
	Band of flint pebbles	0	6
	White sand; the bottom not seen...	6	0

Fifty yards from the western termination of the cliffs (East of Hengistbury Head), where they are still 50 feet high, the Section has no septaria-layers but at the base of the cliff we have :—

Section II.

	Feet.	In.
Loose white sand	10	0
Hard, dark clayey sandstone, with scattered pebbles at base	1	0
Hard yellow mottled sand, shading to white ...	6	0

HENGISTBURY HEAD.

See Plate VII. and Plate I.

The form of the Head must have rendered it a position of great importance to an invading or beaten army in early times, and its advantages were not neglected, as the ancient walls and fosses, known as "Double Dykes," defending it from the mainland, prove.

Section III. (West Side).

Highcliff Sand.—Lower bed with green grains, and upper bed with ironstone.

Boscombe Sands.—Mr. Gardner thinks that the highest beds met with in the headland are undoubtedly the continuation of the white sands at the base of Highcliff. They extend almost all over it, and at the highest point—the Watch-house—are 25 feet thick."

The S.E. extremity presents a good section of the white sands.

Section IV. (South East).

		Feet.	In.
HIGHCLIFF SANDS.	White sand with a few yellow bands	7	0
	Hard white sand	1	0
	Yellowish and orange clayey sand	1	4
	Hard white sand (local patch) ...	0	10
HENGISTBURY HEAD BEDS.	Dark clays and light sand in irregular layers	1	9
	Hard white sand (local patch) ...	3	3
	Brownish sandy clay with ironstone	44	0
	Débris concealing 12 feet bed of green sand.		

The white sands are 30 feet thick at Highcliff, having thinned out from 42 feet at Alum Bay.

Hengistbury Head Bed.—The stratum does not, so far as the coast line of the mainland is concerned, extend beyond the Head itself. It is composed of brownish-drab laminated sandy loam, about 45 feet thick, with 3 to 5 nearly parallel layers of large tabular ironstone concretions. These septaria are conspicuous objects in the cliffs, and form a reef running out to sea.

Boscombe Sands.—The next series is perfectly distinct, and may be called the Boscombe Sands. It represents the principal mass, 148 feet thick, of brilliant-coloured sands at Alum Bay, containing thin straggling layers of flint pebbles with small rounded fragments of quartz. These beds at Hengistbury Head are only seen in the longest or S.W. range of the cliffs.

For half-a-mile (west of Hengistbury Head) the cliffs are very low, being but 17 feet near Double Dykes, and composed of shingle. (See Plate VII.)

A little over three miles (inland) due north of the Head there is another hill or rather range of hills of similar contour to that of Hengistbury Head. This is St. Catherine's Hill, 160 feet high (see Hills in the distance, Plate IV.) It possesses, like the headland, a flat top and abrupt escarpments on all sides, and was also chosen as a strong place in ancient British times, as the remains of a camp, fort, four watch-towers, and numerous tumuli sufficiently prove.

The following Section is exposed:—

Section V. (St. Catherine's Hill).

		Feet.	In.
HIGHCLIFF SAND.	Orange sand and clay ...	3	0
HENGISTBURY BEDS.	Ash coloured clay	3	0
	Drab clay with iron concretions, exactly as at Hengistbury Head	5	0
	Dark and very lignitic sand ...	2	6
	White and yellow sand, with layers of light clay almost white at the base	3	0

We have thus at Hengistbury Head the Highcliff Sands—white sand, with a maximum thickness under the Watch-house of 25 feet.

The Boscombe Sands extend to beyond Boscombe. These, although on the mainland, of white, buff, or chocolate colour, are the most brilliantly coloured of all the sands of Alum Bay, where they comprise 147 feet of sand with occasional pebbles.

A careful examination of the cliffs in the bay from this point to Bournemouth, shows conclusively that there is a general sequence, and that the strata, although nearly horizontal, have a slight dip, sufficient, however, in so great a distance to pass through two complete beds. The upper series is a continuation of the Boscombe Sands, and has a probable thickness of 100 feet, but is here entirely composed of sands shading from orange to white, and enclosing heavy shingle beds. The second series is composed of sands and dark clays of marine origin, which we may provisionally call the *Bournemouth Marine Beds, and which contain numerous and interesting fossils.* Both these series extend to within a quarter of a mile of Bournemouth Pier, the lower one partly thinning out, and being partly replaced by freshwater beds. At a place called "The Cellars, exactly one mile west of Hengistbury Head, and about 700 yards E. of the Coastguard Flagstaff, we find the first regular rise of the beds; 110 yards west of "The Cellars," they have risen but 5 feet, and are frequently obscured by heaped-up shingle. The overlying white sand beds rise with them, and are here 10 feet thick. At about 1 mile and 286 yards west of Hengistbury Head, the cliffs are 30 feet high, with an easterly dip of 7°, and are more than half composed of gravel.

About 900 yards further west the cliffs are 65 feet high, 40 feet belonging to the lower series, and 20 to the Boscombe Sands, with little or no gravel capping.

About 400 yards beyond a little chine, in which the Coastguard Boats are sheltered, the junction line is temporarily lost, and the whole cliff is composed of yellow sand. In the last thirty years there is reason to believe that 100 yards of coast have been washed away, and a monument on Double Dykes has had to be shifted further inland. Wet brings down large masses of mud and sand in a few hours, and perpetual slips cause anxiety to the proprietors of the lands bordering the sea.

About 250 yards further west there seems to be inserted a fresh series of laminated sands, 6 feet thick, with much wood and lignite; but with this exception the cliffs, 77 feet high, are all sand, with only occasional darker lenticular patches, and with very few pebbles in their layers. . . .

Forty-four yards on, the Bournemouth beds—here 40 feet thick—form, as a rule, a nearly vertical base to the cliffs; while the Boscombe sands, frequently nearly pure white and fit for glass-making, always slope back at a considerable angle.

About 200 yards further W. the cliffs again become wholly sand.

About a quarter of a mile further west, where Lord Portman has constructed a concrete road up the face of the cliff, the cliff shows in descending order, gravel, ochreous sand white sand in stratula, white sand with iron-stains, iron coloured sand, pinkish clayey sand *not holding water*, orange sandy clay and sand, thick black lignitic sand, mottled white and yellow sand, and finally much twisted black clay. A little eastward the pinkish clayey sand ceases, the lignitic sand passes into pure glass sand, and there are thick shingle beds at the top

For 200 yards further W. we find the lower half of the cliffs composed of white sand, the upper of orange sand; 90 yards further we meet with very regular layers of shingle and curiously twisted lignitic sands. The cliffs are now about 100 feet high, and 380 yards further W. we reach the *first palæontologically interesting spot.* This is obliquely bedded lignitic sand some 16 feet thick, containing very perfect and almost uncompressed limbs of all sizes of an American form of cactus described by Heer from Bovey Tracey as *Palmacites dæmonorops.* Together with this, and even more abundant, are branches of a *sequoia*-like conifer. The upper part of the cliff is nearly pure white sand.

A hundred and twenty yards beyond this are the HONEYCOMB CHINES (Plate VII.), the sides of which are upwards of 100 feet high, and of most picturesque appearance. Mr. Gardner says, "The ridge separating them, deprived of its gravel capping, and formed of snow-white sand, looks quite Alpine with its sharply cut peaks and water-worn gulleys. The ribbon-like and netted surface produced by weathering has a singular and striking effect."

The beds towards the base are full of interest. A section taken on the east side of the eastern chine shows—

Section VI.

	Feet.	In.
Yellow sand and gravel	20	0
White sand	38	0
Whitish sand with lignitic matter	5	0
Dark reddish, ash-coloured lignitic sand, crowded with *Nipadites*, but almost without other recognisable fruits	1 to 3	
Whitish and ash-coloured lignitic sand, with occasional fruits resembling *Petrophiloides*, *Cucumites*, and *Higtea* of Bowerbank	6	0
White sand matrix, black with rolled lignite ...	2	0
White sandy clay, bored by *Pholas*	3	0
Sand to beach	10 to 12 feet.	

Two hundred and twenty yards to the west of Honey-comb Chine is BOSCOMBE CHINE. (See Plate VII.) The eastern side of Boscombe Chine is overgrown; but the western side is well exposed for nearly a quarter of a mile. The west corner presents a curious instance of denudation by wind which has taken place within recollection. For 50 yards the upper beds have been swept off, the top of the lower and more compact beds now forming a plateau of that extent. (See Plate III.) Proceeding west, the lower beds for 150 yards are dark and compact, forming a perpendicular cliff twenty-five feet in height, the junction between these and the upper series, now of an orange colour, being sharply defined.. For the next 200 yards the sections are obscured by slips. Next to this is the iron ladder path where the cliffs are about eighty feet high, with the addition of a capping of nearly thirty feet of blown sand. Some 200 yards further west, and for another 250 yards, dark yellow and grey sands fifty feet thick alternate.

A little further west we approach the point of final disappearance of the marine series of beds, which, within about 100 yards, gives place to beds of freshwater origin. Before their disappearance, which is due partly to the rise of lower beds, and partly to their passage into freshwater beds, they become greatly disturbed, and have been broken up and re-deposited, while the changes in their composition are so rapid that the most minute and careful examination is required to understand their sequence. *They are mostly highly fossiliferous, and of the greatest interest.* Within less than fifty yards of the last section we have the following:—

Section VII.

			Feet.
UPPER SERIES		Orange and yellow sand ... about	20
		White sand	14
LOWER SERIES.	1	Lemon and ochreous clayey sand ...	3
		Pink and drab clay	1
		Greenish sand with oysters, *Flustra*, &c.	4
	2	Light grey sand	15
	3	Lignitic sand with slightly rounded blocks of a re-deposited leaf bed ...	25
		Angular lumps of unfossiliferous hard dark bands re-deposited in a matrix of light lignitic sand	
		Liver-coloured clay with pyritized stems penetrating	
	4	Light drab clay	3
		Coarse quartz grit	
		Total about	85

In the marine beds numbered 1, and not many yards further west, were obtained several crustaceans. The beds here show extremely well the passage from marine to brackish and freshwater, and are as follows:—

Section VIII.

	Feet.
1. Dark sands with green grains, broadest and lightest at the top, containing masses of *Ostrea dorsata ?* (coated with *Flustra*), an *arca* (apparently *Arca appendiculata*), a *Modiola* (probably *Modiola Nystii*), *Tellina tenuistriata*, and more rarely *Calyptræa trochiformis* (?), *Phorus agglutinans*, *Natica labellata*, and a *Cerithium*.	
2. Liver-coloured clay (turning black on exposure) with abundant remains of *Callianassa*, and, more rarely, a shore-crab. *Bryozoa*, first detected by Carruthers, also abound. A *Unio*-like shell is also abundant, together with some smaller bivalves and a smaller and very rare *Planorbis* (?)	15
(The surface of the succeeding bed is eroded for about 6 inches, and filled in with the overlying clay, which has also formed small pipings.)	
3. Stiff black clays passing into lighter liver-clays at bottom, and after a break, into liver-clays with ferns. Very dark sandy clay. White or ash-coloured sand with lignitic bands	30

At this part of the cliff is a slight indentation caused by a landslip, some thirty yards across, due to a spring. On the east side of this indentation is a marine bed. On the west side occurs the *first leaf bed which bears evidence of having been deposited in fresh water*. To the east of the landslip the last shingle beds of the Boscombe sands occur in lenticular, sometimes truncated patches. About 100 yards further west the marine beds finally thin out and end in a point, the cliffs being nearly all composed of white sand with short irregular patches of vegetable matter. The lowering of the cliffs and the rise of the underlying beds terminate the upper or marine series at this point.

The fauna and flora, and the extraordinary shifting and rapidly changing character of the beds, both horizontally and vertically at this point clearly show that this was the actual debatable margin between the ancient sea and river, beyond which, to the west, it seems clear the encroaching sea never penetrated in those ages.

Here ends the East Cliff. (See Plate VII.)

Mr. Gardner concludes his paper by saying, "With regard to the correlation of the Bournemouth marine beds with those of the London basin, it is clear from reading Professor Prestwich's description of the Middle Bagshot series in that area, that the beds are lithologically very similar. . . . . The presence of glauconate grains is a distinctive feature of the *Middle* Bagshot division, and the fossils that have been found are Bracklesham species. There can, I think, be no reasonable doubt that these beds represent the same stage of the Bracklesham series in the London basin. When we come, however, to the *Upper* Bagshot beds in the same area, considerable doubt exists." For reasons stated by Mr. Gardner, he is "of opinion that no Eocene beds younger than the Bracklesham are met with in the London basin."

In Mr. Gardner's second paper, "Description and Correlation of the Bournemouth Beds. Lower or Freshwater Series, Part II.," he says that in continuation of the former paper (describing the *marine beds* of the Middle Bagshot exposed between Highcliff and Bournemouth Pier), he now proposes to complete the description of the Eocene cliffs of this part of Hampshire, as far as Poole Harbour on the west.

These are of freshwater origin, and chiefly interesting on account of the fossil flora recently obtained from them. This appears to be the most extensive and varied yet brought to light from the Tertiary formations; and its study, even now, promises to modify the views held as to the age of very many of the similar floras described from other parts of the world. The Palæontographical Society has undertaken to publish the entire British Eocene flora.

A principal object of this second paper is to indicate the exact position of the fossil-bearing beds.

The cliffs which comprise the Bournemouth freshwater series extend from Poole Harbour into Bournemouth, and present escarpments averaging nearly 100 feet in height, cut up by many chines. They are composed of yellow, white, and brownish sands and clays, possessing hardly any of the bright red colouring so conspicuous at Alum and Studland Bays; "still in the sunlight, and after heavy rains, their ever varying shades of buff and yellow, orange and black, with their crown of dark pine woods, PRESENT EFFECTS NOT SEEN ON ANY OTHER BRITISH COAST. Looked at in the summer, when baked by the sun and incrusted with blown sand, they appear monotonous, and for years were supposed to be unfossiliferous and on the same plane, much of them being jealously guarded private property."

Besides the cliff exposure at Bournemouth, sections are visible inland in many neighbouring pits and railway cuttings.

Mr. Gardner places Bournemouth in the Middle Bagshots, drawing the line between these and the Lower Bagshots at the pipe-clays of Corfe, Studland, and Alum Bay, on account of the great dissimilarity of the floras contained in them. The Bournemouth flora is distinct from the older floras, and passes upward into the Oligocene flora without any perceptible break, but does not pass downwards into the Alum Bay series. The two series are, in addition to this, *lithologically* distinct, the older being characterized by thicker and purer clay deposits, and coarser and often deeply stained sands, the newer by black or sandy clay beds of *small extent*, and fine yellow sands. No flints or stones are ever found in these deposits; and the coarser material is quartz grit.

DESCRIPTION OF THE BEDS.

In describing the beds in this part of the Bournemouth section, it is most convenient to take what are presumably the oldest first. The sequence of beds deposited by river action is, it is well known, rather horizontal than vertical, the sediments nearest the head of any valley that has been silted up being usually the oldest.

There are many indications that the Eocene river which deposited the Bournemouth strata flowed from a westerly point, and therefore the *western extremity of the cliff section is inferred to be the oldest.* Moreover, close examination reveals that the clays, sands, and grits which do not appear at first traceable for more than a few yards, are really often in parallel zones of some extent, and repose at an angle which exposes at least 400 feet of their thickness.

The cliffs fronting the sea may be divided into three groups, which are not difficult to distinguish when unobscured by blown sand or *débris.*

From POOLE HARBOUR to FLAGHEAD CHINE (see Plate VII.) there are masses of dark clay enclosed in the sand. The principal mass is 1,100 feet long, and about 35 feet above high water. It terminates in the chine (Flaghead), and is barely traceable across to the other side.

Section IX.

(One hundred yards west of Flaghead Chine.)

	Feet.	Inches.
Gravel... ... ... a few feet.		
Cross-bedded coarse sands with rolled pipe-clay...	12	0
Marley white clays, unstratified, with a layer of bright yellow sand	4	0
Slate-coloured clay, with frequent layers of pyrites towards the base	11	0
Black clay, with leaves	0	6
Shading to fawn-coloured clay, with leaves ...	0	6
Regularly stratified, yellowish and white alternating with pinkish sandy clay (this bed is continuous for 1,100 feet)	4	0
White and buff sands	25	0
Black clays, often obliquely, sometimes vertically bedded, usually concealed by *débris.*		

The prevailing leaves are simple, and either laurel-like or willow-like, and frequently attached in numbers to the twigs. A large pinnatifid leaf of the form of *Stenocarpus* is, together with a compound *Acacia*-like leaf, entirely confined to this patch. Other characteristic leaves are a small oval *Smilax* with a thin twining stem, a *Glyptostrobus* (?), and a *Lygodium*.

The only fossil feather yet found in England, so far as Mr. Gardner is aware, was obtained in this bed.

The second group extends from SUGAR-LOAF CHINE to BRANKSOME GLEN and CHINE, and the cliffs are somewhat differently composed. The black clays are almost unrepresented. Only one considerable patch in this group, occurring about 100 yards to the east of the Martello Tower (see Plate VII.), has yielded well preserved fossils. It is 25 feet across. Under this leaf-bed five reefs of pyrites are visible at low water, running south-east, with west-south-west dip. Rocks of pyrites again occur opposite Branksome Chine, although they are never quite uncovered by the sea, but by means of a diver they can be traced two miles out to sea towards Alum Bay.

In the third section of the cliffs, from BRANKSOME CHINE to the BOURNE VALLEY (this includes Branksome Park, Westbourne, and the Bournemouth West Cliff, See Plate VII.), several distinct horizons can be traced. At the base there are (1) black clays, obliquely bedded, recalling those at the base of the fossiliferous series nearer Poole. Then, in *ascending order*, interrupted and often separated from each other by sands, (2) black sandy clay, (3) ironstone, (4) small patches of pipe-clay, or lightish sandy clay, imbedded in sand. Tracing these from bluff to bluff, the dark sandy clay (2) and the ironstone (3) horizons are the most distinct, and dip some 3° E.; but the pipe-clays (4) are for some distance only represented by an irregular *line of small lumps*. Up Branksome Chine these horizons seem to rise 4° or 5° N.W. About half-way towards Bournemouth the dip brings in, at first close to the top of the cliff, a *new* horizon of sandy clay (5), with indistinct leaf impressions at the angle of Alum Chine. The lower bed of dark sandy clay (2) can be traced across Alum Chine and Middle Chine, until at its western angle it is carried below the beach; and, soon after, the ironstone horizon (3) dips out of sight.

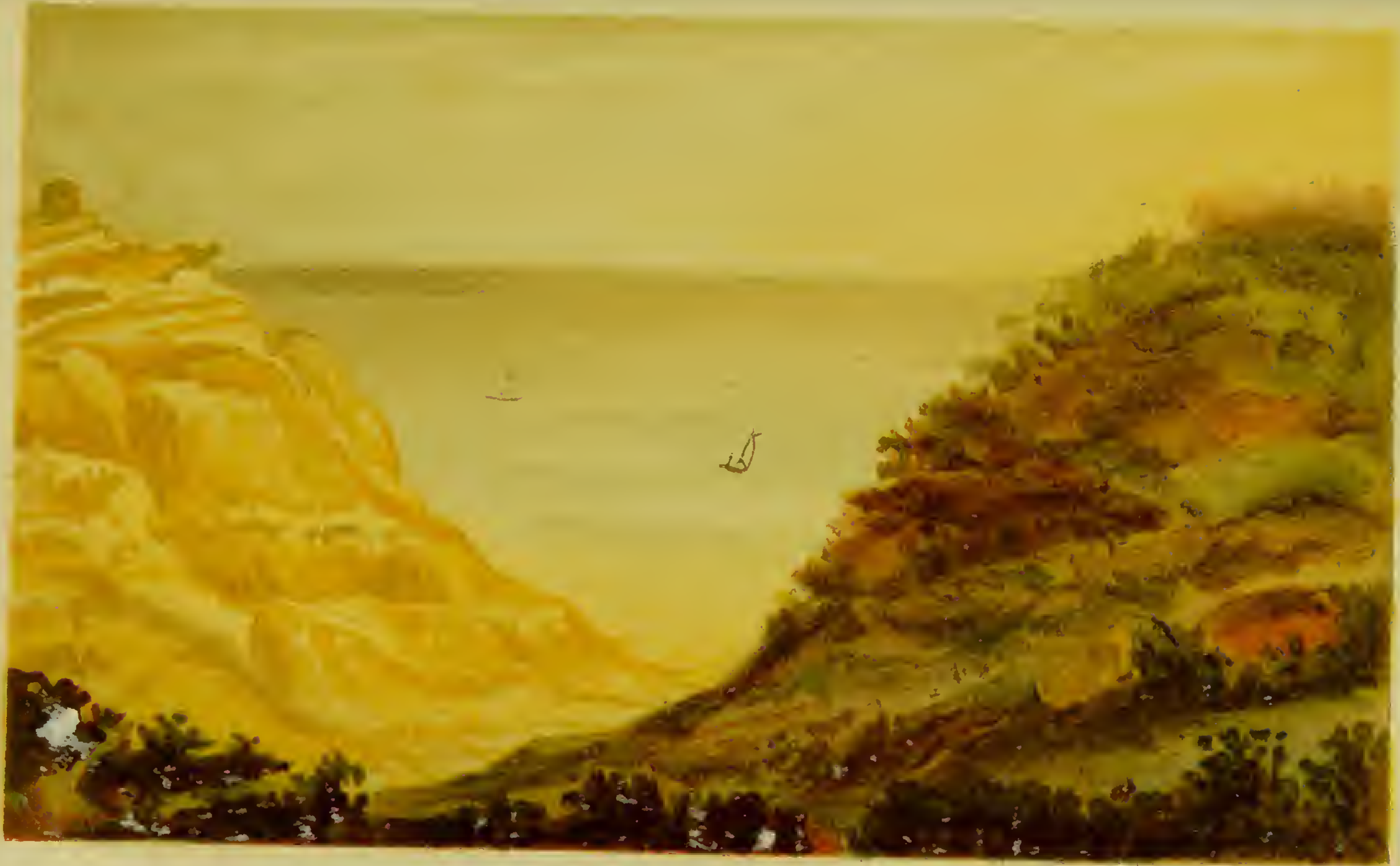
In the meantime the line of light clay patches (4) becomes more defined, and although the *clays are often merely rolled boulders,* they assume importance from the beauty and variety of the fossils which even the smaller isolated fragments contain. These boulders indicate how many leaf-patches were broken up and swept away after they had become indurated. From one of these a large part of a pinna, the spathe, and fruit stalk of a date palm were obtained.

The last bluff on the west side of the Bourne Valley, however, is by far the most important palæontologically. It is traversed by the upper dark clay zone (5), with fossils which are comparatively not well preserved; but the light clay patches (4) below are large and actually crowded with leaves. Towards the western end of the bluff the two horizons are widely separated by an immense wedge of indurated and laminated sands; but under the Highcliff Mansions Hotel they approach to within about a dozen feet of each other, a mass, only ten or twelve feet thick, of orange sand and ironstone, separating them.

The cliff section, exactly under the flag-staff of the Coast Guard Station a little east of Highcliff Mansions Hotel (see Plate VII.) is as follows:—

Section X.

		Feet.
	Light to yellow sand	10
	Black sand...	1
	White sand...	5
Upper horizon of clays	Black clay	3
	Orange clay...	1
	Black clay	12
	Light clay with leaves	2



Sugar-loaf Chine and Martello Tower.—Canford Cliffs, west of Branksome Woods, Bournemouth, September, 1885.—(Natural Section, showing the Character of the Soil.)

Plate D. (*To face p.* 255.)

		Feet.
	Light sand with lignitic grains	2
	Hard white sand	2
	Drab-and-white mottled clayey sand, passing to white sand	18
LOWER HORIZON OF CLAYS	Although no clay is present here, there are patches a few yards east and west abounding in leaves.	

The rest of the Cliff is composed of grits and sands containing iron, with white sand containing lignitic matter near the sea level.

Twelve yards further on, the mottled sandy clay contains *débris* of palms, ferns, rushes, etc. Below this, a few yards to the east, occur by far the richest fossil-bearing beds.

The details are :—First, a layer of quite decomposed *toredo*-bored wood ; then compact blackish clay in a wedge-shaped mass, thirty-six yards long, ten feet thick, with a water worn and uneven surface, laminated, highly pyritous, containing between some of its layers detached pinnules of *Osmunda lignitum*, twigs of *Sequoia Couttsiæ* pines, a small leguminous pod, and other fruits or seeds. (The leaves, etc., are black and lustrous, but very difficult to preserve. The large frond of *Chrysodium* figured in "British Eocene Flora," Pl. 1, and the leaves of palm are from this bed.)

The black clay passes into a cinnamon-coloured clay, containing abundant and exquisitely preserved leaves, even the commonest of which are, as yet, undetermined. The cinnamon clay rests on a band of ironstone, one foot thick and this upon five feet of coarse angular grit, and then follows a patch about one foot thick of light drab and very tenacious clay, full of a small, variable and peculiar although as yet undetermined, leaf, and of a *smilax*. Below this, and separated from it by thirty inches of whitish and orange, more or less lignitic sand, are two beds, four or five inches thick, of sandy clay, finely laminated and full of leaves, becoming, in fact, towards the base, a mere mass of fossilized vegetable matter. The leaves contained in them are much handsomer, larger and in far greater variety than those of any other of the beds. From this point to the pier no fossiliferous beds are exposed; but in excavating the foundations of the club house, which is in their direct line of dip, it is stated that leaves were met with.

[The Pier now comes in, and the Bourne Valley or Chine divides West and East Cliffs. See Plate VII.]

At 300 paces east of the pier, where the cliffs again rise, and some 40 feet above high water, a bed of dark clay comes in underlain for about 100 yards by light-coloured sands, filled with angular blocks of clay. These blocks are mostly of small size; but they contain a flora differing markedly from that of any of the lower beds to the west Most abundant are fragments and even perfect leaves of a large aroïdeous plant, of an *Araucaria* and a *Eucalyptus*; and it is remarkable that, while the *Araucaria* has never been met with west of the pier, it is the prevailing fossil in all beds east of it.

From this point to Step Chine, 350 yards distant (Bournemouth East Cliff), the cliffs are almost all grit and sand; though in places near their base there is much *Toredo-bored* wood, some stems measuring twelve feet long. Beyond this chine the clays and sands are much mixed; and 300 yards beyond Step Chine, the last beds, having the appearance of fresh water origin, are seen. These are a series of thin, sharply defined beds of different composition, brightly coloured, overlain by black marine sandy clay, and resting upon hard white sand. They contain in several places layers of ferns, principally those with reticulated venation, belonging to *Polypodium* and *Acrostichum*. Beyond this (the site of the East Cliff, Bournemouth) there is a mass of sands containing broken-up leaf-beds and lignitic matter, and then the more regular sequence of the marine series. (See pp. 244—252, for sections from Highcliff to Bournemouth Pier.)

The most eastern section of the fresh water series is as follows:—

Section XI.

	Feet.	In.
WHITE SAND.		
Pale and dark yellow sands, and whitish clay ...	4	6
Dark sandy clay, with marine shells	6	6
Dark and bright sands	20	0
Stiff black clay	1	0
Sandy laminated clays with ferns	2	6
Mottled yellow and white sand	3	0
Hard white sand ... . about	25	0

The cliff sections, looked at broadly, show that the prevailing arrangement of the materials is seldom departed from. Interest chiefly centres in the clays, on account of the plant-remains they contain. (See p. 243.) These may be divided by their fossils into three groups:—

1. The *western* group mostly characterised by the presence of *Salix* and absence of palm.
2. The central group, by abundance of palms and ferns.
3. The eastern group, by *Araucaria*, net-veined ferns and *Eucalyptus*.

These differences might be due either to changes in the physical condition of the land, brought about by lapse of time between the deposition of each group, or to the dissimilarity of the stations whence the respective floras were derived, or in part to both causes.

The western series, as we have seen, is separated from the central group by more than a mile of grits and clays, which cannot be traced in horizons like those east and west of it. The absence of dark clays, and indeed of large clay patches and of distinct fossils, the coarseness and quantity of the sand and grit, the want of regularity, and the frequency with which sands and clays have been cut through and re-deposited, seem to show that this was the filling-in of the former actual main channel of the ancient river.

The lenticular forms of the sands and clays in the face of the cliff show that the section must be a transverse or obliquely transverse one, and the fact that the patches which have been cut through invariably present the steep side to the west, points to the direction of the set of the stream.

If this was at any time the main channel, and all occupied at one time, the ancient river must have been more than a mile in width, and the width of its valley subject to floods cannot have been less than nine miles, and was possibly even sixteen miles.

The complete absence of any material derived from flint or chalk shows that no chalk ranges were cut through by it; and the quartzose and granitic sand and pipe-clay show that its sediment must have been mainly derived from an old rock area. .

The clay patches mark ancient pools or slack water creeks; and while it is quite possible that those without fossils, and especially those that are not laminated, may have been deposited in depressions at the bottom of the river itself, it is certain that those with an abundance of leaves smoothly deposited must have been formed away from the influence of strong currents, and in sidings or pools left by the river.

Mr. Gardner says: "I have, elsewhere, endeavoured to show that there was a river of large size, bringing deposits from the westward, throughout the whole of our *Eocenes.* The Bournemouth cliffs, I have long believed, present a section across its bed, and were formed during a continued period of subsidence."

Considerable advantage is gained by attending to the general assemblage of plants in a fossil flora. "As an instance, we find at Bournemouth a leaf hitherto supposed to be that of *Castanea*, associated abundantly and almost exclusively with palms and ferns of tropical American type. The correctness of the determination appears doubtful, since we have no precedent for such a grouping, whereas a species of Godoya even more nearly resembles the Bournemouth leaf, and its presence might be expected in such company."*

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* "British Eocene Flora." By John Starkie Gardner, F.G.S., etc., and Constantine Baron Ettingshausen, Ph.D., etc. Palæontographical Soc., 1879.

CHAPTER IX.

"Ogni medaglia ha il suo riverso."

DRAWBACKS TO FOREIGN TRAVEL.

Question: Why should a Patient go to Bournemouth when there are so many lovely places abroad?—Facts to be considered before deciding where a Patient ought to go—Keith Johnston, R. H. Scott, Lancet, Dr. Aitken and Dr. Theodore Williams on the Climate of the United Kingdom—West Indies—Cape of Good Hope—Ionian Islands—Personal Experiences of Patients—R. H. Otter on Sea Voyages to Australia, Tasmania, and New Zealand, and what to do when you get there—F. Workman, M.R.C.S., on the Ocean as a Health Resort; Personal Experiences of a Voyage to Australia—Sailing Ships and Steam Ships—South Africa; Experiences of Dr. Rubidge and Mr. Otter—Madeira; Experiences of Patients, and of Dr. T. More Madden and Dr. Embleton—Tunis; A Patient's Experiences—Algiers; Mortality in Children, Climate, etc.—Egypt—The Nile Voyage and Luxor; Experiences of Patients—Dr. Dunbar Walker, Dr. Fürstenberg, and Dr. Madden on the Climate and Diseases of Egypt—Professor Flower on the Journey to Cairo and the Nile Voyage—Davos Platz—Weisen—The Maloja—St. Moritz; Dr. Pope, Mr. Otter, Dr. Wise, Dr. Gwillim—Minnesota; Dr. B. Mattocks—The Continent of Europe—Otter—"A Lady's" Remarks—Experiences of Patients—The "Times" on the Dangers of Foreign Cities—Dr. C. J. B. Williams on Cannes—Dr. Hassall on San Remo—Drs. Barety and West on Nice—Patients' Experiences of Hyères—Pau; Dr. Madden—Malaga; Dr. Madden—Arcachon; Patients' Experiences—Italy; Dr. T. K. Chambers—Rome; Mr. Ernest Hart—"Raising the Boom," in Colorado and New Mexico—Satisfactory Experiences of a Patient (Case given)—Dr. Norman's Resort for Invalids in the Rocky Mountains—Santa Fé—La Mesilla—Las Vegas—Kansas—Colorado.

In these days of telephones, telegraphs, steam, electric railroads, clock-work tricycles and balloons; when it seems, to many minds, as easy to travel a thousand miles as to send a message or to stay at home; it is only natural that physicians should be asked :—" Why should a patient go to Bournemouth when there are so many lovely places abroad ? "

During my London career I have, of course, sent patients at one time or another, to most of the Health Resorts of the world; and my experience leads me to place the following notes regarding some of them before those who ask the above question, and before the medical advisers who have to answer it—for the careful consideration of both, before deciding " where a patient ought to go."

It is notorious that the path on the other side of the way always looks better than the one we are on; and notwithstanding an Englishman's pride in his nationality, he is very apt to think that " they do things better in France," or in any other country than the one he is in; and it is only now and then that a traveller is found honest enough to admit to the full the beauties of an English landscape, or to confess that all his experiences have consummated in the conclusion that there is no home in the world like an Englishman's. It is not to be wondered at, therefore, that the restlessness produced by the trammels of illness should urge many, in their sighs for relief, to look wistfully to distant lands.

It is for those less biassed by the pressure of circumstances, and with more materials at command for an experienced judgment, to place the advantages and disadvantages in the balance.

First let us see what a perfectly independent witness, writing simply as a Geographer, has to say of the much maligned climate of the United Kingdom.

Mr. Keith Johnston, F.R.G.S., the eminent Geographer, says, in his " Physical, Historical, Political, and Descriptive Geography ":—

" The climate of the British Isles displays the effect of a maritime situation, in relation to the prevailing south-westerly wind currents of the temperate zone, more remarkably than any other part of the earth between the same latitudes. In comparison with that of any continental region between the same parallels the climate is mild and equable, the winters being considerably warmer, the summers cooler." (p. 178.)

And Mr. R. H. Scott, M.A., F.R.S., says ("Elementary Meteorology"): "It need hardly be said that, in general, equable climates are more favourable to human life than those which are subject to great diurnal or annual fluctuations; and in this respect *the United Kingdom* possesses rare advantages, as we shall see when we come to deal with the question of climate." (p. 45.)

It would appear from an analysis of death rates, &c., published in the "Lancet," January 20, 1883, that there are two sides, even to a dull day; for we read as follows:—"In the months of April, May, and October, there does not seem to be any definite relation between sunshine and death-rates. These comparisons show that, in summer, *excess of sunshine is usually accompanied*, and speedily followed, *by high temperatures and excessive* death-rates, whilst diminished sunshine is usually coincident with temperatures below the mean for the *time of year*, and comparatively low death-rates. The death-rates, however, do not absolutely correspond with the temperature and amount of sunshine, as they appear to be modified by the direction and hygrometrical state of the wind. *A comparative absence of sunshine in winter* is not always accompanied by low temperatures, and is then usually concurrent with death-rates below the average for the time of year. Slight mists and absence of sunshine, in winter, are usually accompanied by moderate death-rates, as they are usually attendant on winds blowing from a warm quarter, and holding a large quantity of aqueous vapour in suspension, *thus preventing excessive radiation* from the earth, which is one of the causes of extremely low temperature in this country, and, consequently, of high death-rates."

Dr. Aitken, writing generally of the geographical distribution of diseases, says (Op. cit., Vol. II.): "It was long a belief that consumption was limited by latitude, and that it never appeared in warm countries,—for instance, south of the Mediterranean. But this is proved not be the case ; for the returns of the army prepared by Sir Alexander Tulloch have shown that phthisis is more frequent in the West Indies even than in this country—a statement first made by Sir James Clark, in his work On Climate, in illustration of the injurious effects of that climate on consumptive patients sent there from this country. According also to the recorded opinion of this author, *great heat* appears to have a powerful effect in predisposing to tuberculous diseases (probably by diminishing exercise in the open air) . . . .

" It would appear that England and Wales, the Cape of Good Hope, and the Ionian Islands, are *more exempt from phthisis* than many countries which, from their higher temperature, have hitherto been supposed to enjoy a remarkable exemption from this complaint." (p. 777.)

Dr. Theodore Williams, after reviewing minutely the several characteristics of various climates, says that " such patients as can live in England without contracting fresh mischief when they take proper care of themselves, should decidedly remain at home, as, also, should those in whom the disease is well advanced, either by the deposition of tubercle or the presence of cavities. . . . On the other hand, there is an indication for change of climate in the first stage, if the disease arises from repeated inflammatory attacks, or in the third stage if the trouble is but small.

" If, however, it is decided to send a patient abroad we should well weigh the question of a sea voyage *with all its uncertainties.* The cases which usually succeed best under this treatment are overworked office clerks, or where hæmoptysis is abundant." (" Dr. Dobell's Reports on Diseases of the Chest," Vol. II., p. 280.)

But we will turn now to some personal experiences of travel recorded by different persons. At p. 9, I have already quoted part of a letter from a patient who came from New Zealand to consult me at Bournemouth, and who afterwards returned to the Colony, in which he refers to some of the unavoidable drawbacks of his voyage. I will now quote some observations by Mr. R. H. Otter, M.A.—who is as well known for the temperate spirit in which he writes as for his large and varied experiences of travel in search of health.

And after hearing what he has to say, with special reference to long sea voyages, we will see how far his experience is confirmed by extracts from a letter, to the Reading Pathological Society, by a surgeon who went out to Australia.

"The great lesson that every invalid must learn who means to profit by wintering abroad," says Mr. Otter (Op. cit.), "is, that he will have to exercise quite as much care and caution to avoid doing imprudent things out of England as he has to do when at home; and, indeed, it is not too much to say that he will often have to exercise more, inasmuch as the temptations to neglect precautions are greater." (p. viii.)

"The preparations for a voyage round the Cape to Australia should be made much more in view of cold, rough weather than of hot and fine; although in the tropics, where a sailing ship is sometimes detained by calms, the lightest clothing often feels almost unbearable." (p. 3.)

"We had calms and contrary winds in the Channel, by reason of which and of the delay caused by the change of surgeons, we did not leave Falmouth till the afternoon of September 17th. . . . We had fair weather through the Bay of Biscay, and on the third morning after our start, we felt the first balmy feeling in the air, and were able to discard some of our wraps and great coats. We had, then, a few days of warm and pleasant weather, becoming gradually warmer till we got into the tropics. Then followed about three weeks of very trying weather; the heat was so great that we could hardly sit on deck during the day time, even under the awning, and the saloon and cabins below became unbearably close and stuffy. The average range of the thermometer in my cabin during this period was from 78° to 84° Fahr., and the atmosphere *was so charged with moisture* that the effect on every one on board was that of being in a perpetual vapour bath. It was difficult to employ ourselves in the day time, and almost impossible to sleep at night. We lay with doors and windows wide open, but we could not get the least breath of fresh air, and the perspiration ran in streams off our hands when we put them out of bed. There was no refreshment even in our morning bath, as the temperature of the water was almost as high as that of the atmosphere, and the exertion of dressing left us in a complete state of exhaustion for the rest of the morning. I need hardly add that we had but little appetite for our meals. It was a trying time enough for the strong, but especially trying for invalids." (p. 6.)

"We crossed the Line about midnight, on the 14th of October, with a fresh S.E. trade wind, and then had a succession of beautiful days till the 25th, when we got into latitude 28° to 29° South. These were the most enjoyable days during the whole voyage. . . .

"On the 28th of October we met with the first cold wind from the South, which wind continued, with very few days' intermission, all the rest of the voyage. We had two or three single days of warm weather, when there was almost a calm, after that date; but, roughly speaking, the cold winds continued and increased in severity till we sighted the Australian coast. During the latter part of our voyage there were days when the decks were quite slippery with ice, and a strict look out was kept for icebergs. We could not sit on deck with any comfort, though wrapped up in shawls and great coats, and we even sat in our great coats in the saloon, and used them as additional coverings in bed without succeeding in keeping ourselves warm. We had only a few days of really bad weather during the whole voyage; but, on the other hand, not a great many days when we did not suffer more or less from *cold* or *heat*, and we had certainly quite an *average passage at about the best time of the year.*" (pp. 7, 8.)

"Some of the other passengers had colds, and one of the invalids had an attack of pleurisy which confined him to bed for two or three days; but in other respects the health of all the passengers was good—and the wonder is how few colds are caught on board ship, where every condition seems favourable to catching them. When caught, however, they are very difficult to get rid of." (p. 9.)

"I think that, if a long cruise could be made in a very comfortable and well-found ship, in moderate latitudes, say between 40° and 20° north, and with pleasant companions, it would do most invalids, whatever might be the nature of their disorders, a great deal of good. But when a voyage has to be made in a moderate ship, in all kinds of weather, and with such excessive vicissitudes of temperature as are entailed by a voyage from England to Australia round the Cape, I think that doctors ought to consider very seriously before advising their patients to undertake it." (p. 12.)

"It is especially important for invalids who arrive in Melbourne after a sea voyage to be very careful in the matter of clothing whilst they remain there. The changes of temperature in a single hour are often extraordinary; a bright, still morning will frequently be succeeded by a cloudy and gusty afternoon, the wind being exceedingly cold and penetrating. I was caught in one of these sudden storms the second day after we arrived in Melbourne. The morning was fine and bright, and I had taken an umbrella to keep off the sun. Suddenly the sky clouded over, and there was a heavy shower of cold rain, succeeded by high gusts of wind and clouds of dust. This is such a well-known occurrence that nearly all the residents wear dust coats to preserve their clothing, even when walking about the streets on business or pleasure, and dust protectors of all kinds seem to be one of the principal articles of commerce in the shops." (pp. 21, 22.)

"I should recommend invalids who arrive in Melbourne during the months of November, December, or January, to postpone seeing the place and neighbourhood till a more favourable time of the year, and to *start, as soon as they conveniently can do so after their arrival, for Tasmania or New Zealand.*" (p. 24.)

Extracts from a letter to the Reading Pathological Society on "The Ocean as a Health Resort," by F. Workman, Esq., M.R.C.S., dated Melbourne, Australia, 1882.

"The great and undeserved kindness I received from you on leaving Reading encourages me to hope that you may be glad to hear from me at the Antipodes, and I trust also that the experience I have had during the last three months on the so-called hospital ship may prove of some value in these days when long sea voyages seem coming into vogue as a means of treating disease. 'The Ocean, as a Health Resort,' is the title of a very able book by Dr. Wilson, who treats the subject as a whole, and gives very useful information about the different lines, and the preparations to be made, and he particularly describes the 'Sobraon' (the ship I sailed in) as a good type of her class; but from what I saw and heard it appeared to me that the conditions of sea life are very imperfectly realised either by doctors or patients. Certainly I listened to many bitter lamentations from people who, had they at all known what they had to go through, would never have dreamt of coming; and that leads me to observe the first drawback, viz., that a patient passenger is committed to a *novel course of treatment, to last nearly three months, from which there is no withdrawing, how ever much he may hate it,* or how ever little it may suit him. 'Australia or death' is the word. . . . [See Chap. I., p. 6.]

"The rapid changes in the temperature and the weather are very trying to any but the strong, or at least thoroughly convalescent. We had unusually good weather, *i.e.*, we had no storms of any violence, and took eighty-four days—rather long, but there were 13,000 miles of salt water to be traversed, as a sailing ship has to go a long way round to catch the right winds. . . . When we reached lat. 15° N. (having gone inside the Cape de Verd Islands) the wind died away, and we were becalmed. Instead of doing two hundred and ninety-four knots (320 miles) in twenty-four hours, as we did the day after passing Madeira (a week from Plymouth) we averaged only forty for the next ten days, and did that only by occasional flows of wind. A great part of each day the ship lay with her head pointing anywhere but her course, and the sails flapping in melancholy fashion against the masts, and the vertical sun shining through the misty atmosphere on the glassy ocean, rolling sullenly. This knocked people up more than anything. We did not have any very high temperature; but that of the sea, and of the wet and dry bulb thermometers kept between eighty and eighty-four, and there was never more than a degree or two of difference between them, which meant that the air was saturated with moisture, so that insensible perspiration was all stopped, and the night temperature was much the same as the day. . . . . Occasionally we had heavy rains which never cooled the air. . . . I am sure that ten days' sweating bath was the turning down point with more than one. . . . Onward to S. 30° we had most delightful weather, but thence down to S. 44° (to which we were driven by head winds), and all the rest of the way to Australia (one hundred degrees of easting from the Cape) was characterised again by raw blustering weather, with rather big rolling seas, and there was no lounging on decks, but walking briskly about in great coats and shawls. Even when we made Cape Otway in Australia, on December 17 (about midsummer), the weather would have been a disgrace to the British Channel in September, wet and blowing, and the land blotted out by fogs and mists. Such changes cannot always be challenged by the phthisical and delicate with impunity, and that more than one of my fellow passengers found out.

"Next as to the ship:—The *Sobraon* really deserves her boasting title of 'magnificent clipper,' being one of the largest ships afloat dependent on sailing power alone. . . . . She was well-officered, the captain and mate being both gentlemen and good seamen, and very agreeable; the stewards were mostly of a good and obliging class, though too few; two deserted at Plymouth, and were not replaced. The stewardess was simply a nonentity; she was a respectable woman who worked her way out, and, save that she attended a paralytic lady as her maid part of each day, I never heard of her doing anything on board except tatting. A lady died in the tropics, and an infant was born two weeks before the end of the voyage, but she did nothing on either occasion. . . . The diet was fairly good, three square meals a day. . . . A passenger in pretty good health might do very well, and, as a matter of fact, I enjoyed the voyage extremely, and was quite well throughout . . . . but as an invalid ship . . . . I can only say that she was entirely devoid of organisation as such.

"Of a truth, I saw plenty of reason to decide that if a ship is a pleasant place to live in (for those who like it), it is a most wretched place to die in; and that those who propose taking a voyage for their health should look on the other side of the picture, and consider how they will fare, if sea life does not agree with them, and they are confined to their cabins with none of their home comforts or attendance.

"We had three deaths during the voyage and one suicide. . . . The first death was a lady, who had come out to nurse a phthisical husband (my patient, E. B.). She was apparently well at starting, but six months before had lost her leg from some morbid growth. She suffered much from gastro-enteric irritation, and in the hot weather acute pulmonary œdema carried her off in a few hours. . . . Burial is prompt at sea—always at six a.m. next morning. Even in the case of the two consumptives, who did not die till after midnight, they were over the side before the passengers knew of their deaths. . . . I daresay the captain was right, that the presence of a dead body on board depressed others. . . . The suicide was sensational—that of a young lady of eighteen, the daughter of an eccentric, bibulous mother. . . . Next day utter dejection prevailed aboard. The sea is a dangerous place to send romantic, impulsive young ladies to! . . . .

"The somnambulist I spoke of was a curious case. He was a young fellow of nineteen, belonging to an ultra-religious family, from whom he did not part quite happily. . . . He used to get up and walk about the decks, talking with the watch and others, and then go back to his bunk, and know nothing about it in the morning. . . . One night, between one and two a.m., he perfectly scared them [some card-playing passengers] by suddenly thrusting his white, ghostly face, with wild, glittering eyes, amongst them [in his trance] and insisting on taking the *young* man into his cabin; the latter was nearly frightened into a fit. . . . In the hot weather this somnambulist gave me much trouble; he got into a partly cataleptic condition. . . . Here, again, I was in much difficulty for a proper nurse; some ladies were very anxious to help, but were full of their own crotchets, and were unmanageable. . . . We had on board also some young men who travelled for a moral, as well as physical change—two dipsomaniacs, who gave much annoyance to invalids by their late hours, noisiness, and smoking, and who gave a good deal of trouble. . . . Another evil on board a *sailing ship is the great noise made in working it,* far worse than the monotonous grind of a screw, to which one becomes accustomed. Sailors, surely, make tenfold more noise in their work than any other men I know of; they cannot haul at any rope without yelling at the top of their voices. I know there are some who find these chantees musical, but it is not nice as one is just going off to sleep to hear the mate shout out, 'Now then, the main tack!' and about twenty fellows seize hold of it, and run tramping overhead on the deck, hauling at it, and bellowing like a herd of bulls; and this occurs in light winds two or three times every night, as the yards have to be trimmed to meet a shift in the wind.

"I sum up this, I fear, long yarn, by saying that my conviction is strong that it is a great mistake to send invalids to sea for a long voyage who are not thoroughly convalescent and able to bear some roughing, or at *least providing them with a cabin and attendant* to themselves. My experience is that a sea life benefits and hardens those who are only out of condition or suffering from struma, but that those whose lungs are decidedly affected—who have tubercular deposits—the risk from taking cold, exhaustion from sea-sickness or tropical heat, decidedly outweighs any prospect of benefit, and that such would do better by selecting some European or African health-resort which they *can leave should it not agree with them*...

"I advise a patient to take a small case of such wine as he will require with him, and some store of light literature. One requires great resolution to read anything solid, as there is constant movement and interruption, either on deck or in the saloon, and that constitutes another drawback for invalids,—there is no repose or quiet outside their own cabin. Moreover, eighty-four days is a long time to be at sea, entirely cut off from the rest of the world. . . .

"Of Melbourne I need only say that its chief characteristic is *dust*; a bright, clear atmosphere and plenty of sun, but not as a rule hotter than in July at home, and quite as variable in temperature. The first Sunday after landing was wet, and I was up the country, and we kept a good fire going all day and enjoyed it. The Saturday following we had a regular 'brickfielder' from the north—a dust storm. Melbourne seemed wrapt in a dense fog, and the temperature at the observatory, on high ground a mile out of Melbourne, was 99·3° in the shade!"

But supposing the voyage out to Australia or New Zealand to have been safely accomplished, and that it is desirable or unavoidable that the patient should stay for some time abroad, let him consider the following wise counsels of Mr. Otter as to what he should do while he is there, and then imagine what he would say if he were advised by his doctors to dance backwards and forwards over similar distances in his own country!

"I should decidedly recommend Sydney," says Mr. Otter, "in preference to Melbourne to invalids who might have to pay a lengthened visit to one of those towns. I have grave doubts whether either place is particularly suitable for invalids who have any serious affection of the lungs; but in cases where persons having a consumptive tendency are obliged to reside out of England, and yet to live in a town in order to follow some occupation, I should certainly *recommend Sydney* as a place where they would be likely to spend their days as happily and profitably as anyone can expect to do who is banished from his native land.

"It might be well to spend the hottest summer months in one of the high-lying towns in the neighbourhood, or, better still, in Tasmania or New Zealand; but during the rest of the year I believe that Sydney could not easily be surpassed for a beautiful and healthy climate. The mean temperature of the summer in Sydney is 74° Fahr., and of the winter 55° Fahr., making the mean annual temperature about 65° Fahr. The *hot north winds* during the summer are very trying; and no great invalid should venture out of doors during their prevalence. They are succeeded by a wind from the south, which causes a very sudden and great lowering of the temperature, and which has to be provided against quite as carefully as the hot wind from the north. But *no country in the world that I know of is free from all climatic disadvantages* throughout the year; and every person, whether well or ill, is bound to take reasonable precautions against them. To the best of my belief Sydney is as free from these disadvantages as any town in the world, with the exception, perhaps, of *Hobart Town*." (pp. 48, 49.)

"From what I could learn from residents and visitors, I believe that an invalid might live comfortably and advantageously in Tasmania during the whole year; but I incline to think that, if possible, he *should go to some warmer colony* on the breaking up of the summer, for two or three months, even if he were to return to Tasmania for the winter. . . .

"The pleasantest course to take, and which, I think, is the most healthful for an invalid visitor in Australia, is to move from colony to colony, gradually getting northwards as the winter progresses, and this was the plan which we adopted.

"The drainage of Hobart Town left much to be desired. A large open main sewer ran through the centre of the town, the exhalations from which were, at times, powerful and noxious. The odours, too, in some of the smaller and less frequented streets were far from pleasant, and called to mind the probable existence of typhoid and other fevers in the place. We had a most grievous evidence that typhoid fever did, in fact, exist, and in a most virulent form. My cousin, a strong young man, was attacked by it . . . and he died in about three weeks . . . . The fever was most acute and rapid. . . . (p. 33.)

"The summer began to break up about the middle of March, and we had a fortnight of showery and rather cold weather. (p. 34.)

"Invalids who require a warm, dry, and equable climate throughout the whole year would find it to a greater certainty *on the mainland* of Australia, where they can get far away from the disturbing influences of the sea; but English-born persons, who are only in search of a finer climate than they can get at home, with something like the same variations of temperature in the different seasons, but with much more sun, and much less rain and cloud, will find, I believe, nearly all they require in the beautiful island of Tasmania." (Op. cit., p. 37.)

But there are places much nearer home than Australasia to which invalids may be sent. There is South Africa, for example, the voyage to which is often called by the ship's officers "a mere gipsy party trip." Let us see then what a doctor practising in South Africa has to say about the difficulties to be encountered and the necessities of travel *after a patient gets there.* I quote from a letter from R. N. Rubidge, M.D., Physician to Province Hospital, Port Elizabeth :—

"For my purpose South Africa may be divided into—

"1. The Eastern coast regions. Low hills and plains of palæozoic slates and mezozoic sandstones and clays. This tract varies from ten to thirty miles in breadth, and is bounded by a range of quartzose mountains.

"2. The intermediate region beyond the first mountain range. Koroo plains and low hills, with an average elevation of about 1,500 feet, and about 100 miles in breadth.

"3. A high mountainous range bounds the last region, and beyond it are the great plateaux of the interior, 4,000 to 6,000 feet above the sea, and intersected by minor hills and mountains. Through these vast plains run the Orange, Caledon, and Vaal rivers and their tributaries.

"4. The low hills and plains on the Western or Atlantic shores of the Continent.

"Of these regions the *first* has a not unhealthy climate; but the alternation—of north-east wind blowing over the dry and hot Continent, with the cold south-east wind from the sea, with their widely different hygrometrical and electric conditions—*renders it unsuitable to cases in which tubercle is developed or threatened.* While Port Elizabeth and Uitenhage, from their geological position on the margin of a mezozoic bay, on whose bottom a deep series of clay-beds was deposited, are peculiarly unadapted to such cases.

"But it is on the high plains, stretching from the second range of mountains I have mentioned, to beyond the Vaal River, and including the higher part of the district of Graaf Reiner, with those of Colesberg, Richmond, Victoria, East and West Albert, the Free State, and the high lands of Kaffraria, that perhaps the finest climate in the world for pulmonary complaints is found. I have sent many patients thither who have come out from England with diseased lungs, and some in whom phthisis had been developed here, and I have rarely or never been disappointed. Some have lived much longer than they would have done here; others, in whom nearly half of one lung was consolidated, have quite recovered, and remained well for years." (*Lancet*, October 20, 1866.)

And Mr. Otter (Op. cit.) concludes his remarks upon South Africa with the following words :—

"I would strongly advise invalids who go to the Cape not to remain too long in the neighbourhood of Cape Town; not to take up their abode there for any length of time within one hundred miles of the sea coast, nor less than fifteen hundred feet above the sea-level. Unless these conditions be complied with I cannot think that persons with diseases of the chest or lungs would derive any great benefit from a residence in *South Africa*." (p. 174.)

Cape Town, Mr. Otter thinks, "is not a desirable place for persons with delicate lungs. It is subject to dust storms, sometimes violent enough to hurl pebbles and small stones through the air. These stones are raised by the north-east wind, which is there considered the *general scavenger* of the place and purifier of the air, and is known by the name of the 'Cape doctor.' The water supply is very inadequate, and so bad is the drainage, and so numerous and noisome the smells, that the place would be almost uninhabitable without this wind. It often rises about one or two o'clock in the afternoon, and rages fiercely for two or three hours and subsides before sunset." (pp. 150, 151.)

"The advantage of a voyage to the Cape over the voyage to Australia is that the changes of temperature are not nearly so great. Within two days after leaving Dartmouth the steamer gets into warmer weather, and if the passage be a fine one and made at the proper time of year, the passenger ought not to suffer from cold during this part of the voyage." (p. 149.)

But, it may be asked, Why go on to South Africa, if there are so many drawbacks, while the magnificent island of Madeira lies so much nearer in the same voyage?

Well! here are some extracts from the letters of a most intelligent patient, who had seen both sides of the picture in many health resorts.

October, 1882. "Madeira is enchanting. I have seen no spot so beautiful, but the *heat,* it must be acknowledged, was too great when we first arrived (end of September). Thermometer 75° to 80° in bedroom, never falling at night below 74°. . . . Since the rain, the air is much better, thermometer sinks to 69° at night. . . . The life here is the ideal life for an invalid, windows open night and day, a continual circulation of pure air—with the exception of two days, during the rains, I have been out from 9.30 a.m. to 6 p.m.; the effect on my digestion is excellent. . . .

"If my lung would only give up smouldering, I think this life would give me the best chance I have yet had. I much enjoy being carried in my hammock, and get high up on the hills without the least fatigue."

December 28, 1882. "I am doing wonderfully well here, Dr. —— reports that my lung is wonderfully better. I have begun to ride a pony at last. . . . I think you will be contented with my progress next summer. . . .

"It is very hot here, too hot almost for my taste, but as I am doing well I ought not to complain."

March 16, 1883. "You will be greatly surprised to hear that we have decided to spend the summer in Madeira. No doubt you have heard from Dr. —— how well this climate suits me. . . . I hope you will concur in thinking it wiser to stay where I am doing so well than to risk *the fatigue and upset of the two long sea-voyages* for the sake of three months of our English summer: . . . . recovery no longer seems so utterly impossible: . . . . I get up to breakfast at 8.30 and always sit up to dinner. . . . . We propose taking a Quinta 1800 feet above the sea level, there is plenty of shade, and it is surrounded by pine and chestnut woods. My lung has been steadily improving all this time, but bronchitic coughs trouble me when it is cold, for it can be cold at Madeira, the thermometer is only 60° now in my bedroom, 4° too low for my bronchial tubes."

July 9, 1883. "I much regret that I was ever persuaded to stay on here—for the last three months (April, May, June) there has been incessant rain, or thick driving mist; to-day as I write there is a hot mist, one cannot see 10 yards from the windows; as far as I can get any reliable information the spring and early summer is always one long vapour bath. Dr. —— now advises me to return to England: . . . . we are obliged to have fires in spite of thermometer at 68° (as everything one touches is damp and sticky); this raises the temperature to 75° (far too high to be pleasant). . . . I have had real blood-spitting: . . . my cough is much worse; I have lost a great deal of flesh and the expectoration is profuse. . . . . Indeed I think myself I shall not get any better. . . . The point now is whether my cough would be *better in a drier air?* It is very painful and harassing. My temperature is never much over 100°, but it is never normal as it used to be: . . . . the depressing nature of this climate soothes the nervous system and helps one to accept the inevitable; and it is never really cold, on the other hand it is terribly damp, and one feels no desire to struggle against death, if such a struggle is still desirable. . . . . I will let you know if we come home as I should like to have your opinion."

Dr. T. More Madden says (Op. cit.): "Of all the climates described in this book, that of Madeira is unquestionably the *most equable*. . . . The extreme humidity of this climate is shown by the impossibility of keeping steel instruments free from rust, or of preserving any musical instruments in tune, or any article of clothing, however carefully packed, from being injured by the dampness of the air. . . . In the summer the Leste wind from the African coast occurs periodically for a few days, and is very similar to the 'Terral' of Malaga, or the 'Khamsin' wind of Cairo, being not only intensely hot and dry, but also laden with impalpable sand, and most irritating to the lungs and injurious in its general effects." (pp. 49, 50.)

Dr. Dennis Embleton, Consulting Physician to the Newcastle-upon-Tyne Infirmary, etc., says, ("A Visit to Madeira in the Winter of 1880-81") :—

"On Christmas-day we took tea in the open air . . . amid roses and poinsettias, and shaded by camellia trees, in flower, from the hot rays of the sun.

"Soon after the rains began, and lasted, with an occasional fine day, for about a month. During this time torrents of rain fell as they do in thunderstorms in England. . . . The air became of necessity almost saturated with moisture; everything outside was thoroughly soaked, and every article in the house became damp. Our clothes were scarcely ever dry; the bed and bed-clothes had to be dried before our invalid and his wife could retire for the night. This was a matter of difficulty and time, as we had only a small iron stove (fogão) in the *sala* or drawing-room, in which pine-wood logs burnt rapidly and wastefully away. . . . In March we had again cold weather with strong gales from the west, lightning, thunder, and rain; the winds—especially about the equinox—lasting daily for a fortnight. . . . In respect to the amount of rainfall, these two places—Funchal and Newcastle—are, curiously enough, very nearly the same; only in Madeira the rain is more regularly periodical, and occurs after considerable intervals of time, and mostly in the autumn and winter; whilst with us it is more equally spread over the months. . . . It must be borne in mind that here, as well as at home, the years and the seasons vary as to the atmospheric temperature, winds, and rainfall. . . .

"No invalid should run the risk of exposing himself to the direct rays of the sun during the greater part of the day." (pp. 49-55.)

But why not save a long sea voyage and go to the North Coast of Africa, instead of to Madeira or to South Africa? Why not go to Algiers, or to Tunis, for example? I have sent patients to both places, who have done well; but still there are "drawbacks," as will be seen from the following extracts from a letter, of a patient belonging to a family of whom most had died of phthisis, and whose husband took her to reside at Tunis, where he had business, in the hope of saving her life. She did well for a time—but not for long, and died there of the family scourge.

March, 1875, she wrote to me—in good spirits about herself but in alarm as to the *mortality among children*, and not without cause, for she had several of her own:—"I may say, generally, that the climate of Tunis is magnificent all the year round. It is considered to be far more healthy than in Algeria, or any other country in the Mediterranean, especially if looked upon as a permanent habitation, because the heat in summer is not excessive, and does not extend over more than two or three months of the year. In winter the thermometer averages about 52° Fahrenheit, and it is quite exceptional to see it as low as 45°. The hot months are from the middle of July to the end of September, but even during that period a fresh sea-breeze springs up every day about noon, and the thermometer seldom rises above 75° Fahr. in the shade, excepting when occasionally a desert wind blows.

"The air is very dry, but there are sometimes very heavy dews during the night in summer.

"The natives and other inhabitants here are almost entirely free of any disease, and there are no epidemic diseases, *with the exception of diphtheria among children.*

"Unfortunately, however, although the country about

Tunis is hilly and very pretty, the town itself has not a very inviting appearance, and the accommodation afforded is none of the best. There is, besides, *no means of recreation*, and the sameness of every-day life soon becomes tediously monotonous. . . .

"Can you give me any suggestion about *diphtheria?* I am so afraid for my children; it has become quite an epidemic here, and children are carried off by it in a few hours sometimes."

Of Algiers, Dr. T. More Madden says (Op. cit.):—"At all seasons the temperature of this place is subject to great and sudden changes. Profuse dew falls at night, and the atmosphere after sunset becomes loaded with moisture. For this reason it is never safe for valetudinarians to be abroad before the sun has some power in the morning, or after sunset at all. Exposure to the night air is not only dangerous to European invalids, but prejudicial to persons in health."

"Throughout the whole of Algeria there is a great tendency to febrile affections, though they are less common in the city of Algiers and the adjacent villages than in any other part of the colony. . . .

"The Algerian climate is very fatal to European children between the ages of six months and two years."

"Out of 540 patients in the Civil Hospital of Algiers when I visited it, no less than 50 were pulmonary cases; and I believe that—unless great precaution is observed by invalid visitors to Algiers, in their dress, modes of living, and, above all, in the careful avoidance of exposure to the night air and cold winds, and a constant recollection of the remarkable difference of temperature which exists between the sun and the shade—this climate is a hazardous one for patients suffering from pulmonary complaints."

"Cases of phthisis, accompanied with hectic sweats, are often aggravated here; and I have heard invalids complaining that their night perspirations, which had been controlled by changes of air in the journey from England, again returned after a few days' residence in Algiers." (pp. 57-60.)

But Egypt!—"the most perfect climate in the world"—surely there can be no drawbacks there! In Chapter I. (pp. 7, 8) I have given some extracts from letters of patients about the Nile voyage and residence at Luxor; and now I will quote from another patient's letter on the same subject, and, then, give extracts from several unquestionable and independent authorities for the guidance of patients :—

"Turin, 18th May.

"We started from Cairo on the 7th January up the river, and, at first, found the mornings and evenings very cold, even to a thin coating of ice on the decks once or twice. The difference of temperature between 7 A.M. and 2 P.M. was often 12 to 20 degrees Fahrenheit, but the air was singularly light and clear, and my bronchitic symptoms disappeared.

"Although the improvement in the chest was great, I suffered in another way, having to take aperients the whole time we were on the Nile. I was also afraid of gout making its appearance. We could not get any Vals water (as it will not keep in Egypt). Dr. Grant told me to take lithia water, which had a good effect.

"We found the weather steadily improved as we went south, and when we got to Assouan, on the 10th February, it was very warm, 84° and 86° in the shade, but we had sailed 600 miles up the eternal river, and were close to the tropics!

"Our life on the Nile did not suit Mr. —— nor ——, nor my brother, (who was with us). Mr. —— had a long time of diarrhœa, and grew thin and weak, and —— was depressed with the hot weather, and sneezed all day; my brother suffered from biliousness.

"The truth is, that a journey on the Nile is only fitted for invalids.

"Our gentlemen did not get sufficient exercise to keep them right. We spent nine weeks on the Nile, and left Cairo on the 31st March for Malta.

"The moment we exchanged the dry air of Egypt for stormy days in the Mediterranean, *we took bad colds*, and mine lasted three weeks—a very sore throat and a good deal of coughing and expectoration.

"We came from Malta to Naples, thence to Rome and Florence, and are now en route for Paris. We hope to be in London some time in June.

"Our journey would have been a success had our party been all well, but their illnesses were a constant anxiety. My maid added to our distress by having sun-stroke. She suffered dreadfully, and was eight days in her cabin; I and —— up with her at night. No doctor.

"We are looking forward to a rest now, as constant travelling is somewhat tiring, and I feel now and then thickness in the chest."

Dr. Dunbar Walker (Op. cit.), points out many difficulties to be set against the glories of the Egyptian climate. Thus he says:—"In quitting England the invalid and traveller leave behind them diseases that are common to the sea-girt, moist island, and in traversing the country to a more southern and tropical climate they encounter new forms of the great enemy. It is to these I would direct the attention of all that set out for these sunny regions . . .

"It is the organs contained in the upper part of the body, or thorax, that are most liable to disease in cold climates, while in warm it is the organs *situated in the abdomen* that suffer most. Instead of inflammation of the lungs we have inflamed liver; for pleurisy we get peritonitis; for increased discharge from the bronchi, or bronchitis, we get increased flow of the mucous membrane of the bowels, constituting diarrhœa, which, when aggravated, leads to dysentery. These two are the most common diseases which attack the fresh arrival from Europe." (p. 55.) To these he adds "*cholera*," now (1884), unhappily, raging on the Continental line of travel; also "malarious diseases," "sun-stroke," "ophthalmia," "skin diseases" and "the plague," as other dangers specially to be avoided in Egypt.

Professor Flowers, F.R.S., in his "Notes of Experiences in Egypt" ("British Medical Journal," 1874), says:—

"The only time of the year when an Englishman would think of visiting Egypt for the sake of health would be in the winter months, from the beginning of November to the beginning of April. During this period the climate . . . is admitted on all hands to be the finest in the world. . . . But," he adds, "notwithstanding all recent improvements in the means of communication, the distance will be to many a serious obstacle to undertaking the journey.

"A sea-voyage, varying in length, according to the route taken, of from three to thirteen days, is necessary in order to arrive in Egypt.

"Doubtless, voyages may be made under favourable circumstances The weather may be fine, the ship not crowded, the cabin comfortable, the companions pleasant; but the risk and uncertainty of what is before him, the chance of being exposed to such depressing influences as most seriously affect the health, should make an invalid hesitate before venturing on a longer voyage than is absolutely necessary. Of one unfavourable condition, any one going out to Egypt or returning may be pretty sure, *that is, excessive crowding of the vessels*, it being just the season of the rush of travellers to and from India and all parts of the East; and passengers who make the whole journey have naturally much greater advantages in the choice of cabins and other accommodation than those who are only picked up on the way."

It must be remembered as *one of the drawbacks* to the charms of wintering in Egypt, that "in returning from Egypt the journey should be so arranged that the patients reach Europe when summer is approaching, so that the *change* *of climate* may be less felt. It will be generally found expedient to pass some little time at Alexandria or Ramleh, and after the voyage to return by slow stages through Italy. Corfu may also be taken as an intermediate resting place." ("Cairo and its Climate." By Dr. Moritz Fürstenberg. "Lancet," 1873.)

Dr. Dunbar Walker says (Op. cit.), "European travellers bound for a winter in the east, would not find the beginning of November too early to be in Egypt; and they can prolong their stay till the end of March or beginning of April, when the heat is increased by the 'Khamsin,' a wind which brings with it a feeling of *languidness and oppression detrimental to all communities of travellers.* Unless absolutely necessary, it is better for the invalid not to land in England till June; and the question arises, How is the traveller to occupy this time?" (p. 94.)

"As in the case of almost every thing else," says Professor Flower, "the expense of Nile travelling appears to be increasing at a rapid rate. . . . Egypt offers almost every advantage for a winter residence for invalids excepting *economy.*" This expense is much increased by the extra travelling and necessary delay in returning to colder climates referred to by Dr. Dunbar Walker and Dr. Moritz Fürstenberg.

Dr. Fürstenberg's suggestion to delay the return by stopping at Alexandria, I cannot recommend, for "Alexandria has no reputation as a health resort. It is surrounded on the land side by marshes; its climate in winter is variable, and often cold from the prevalence of north winds, and it is subject to violent storms of rain, which convert the streets into rivers of liquid mud: . . . . mosquitos and fleas abound. . . . . It should be the object of those who go to Egypt for the benefit of their health to breathe as much of the air of the desert as possible, and it is unfortunate that this cannot at present be obtained in the places of residence which afford the greatest facilities and comforts for invalids. Cairo is situated on its edge, but the hotels, and all the modern town, in fact, are built on low ground, which, until reclaimed artificially, was subject to the overflow, and they have the whole of the ancient city, with its crowded population and impure streets, between them and the desert. Moreover the prevailing winds, being from the north, blow directly across the Delta. This, and the great amount of dust, not of the cleanest kind, which fills the air of a great city full of people and animals, form the drawbacks to *Cairo* as a residence for invalids." (Prof. Flower, Op. cit.)

Dr. T. More Madden says (Op. cit.): "In every part of Egypt the invalid traveller should avoid the night air as he would poison, for there is immediately after sunset a sudden and dangerous transition, from the hot atmosphere of the day to a chill night air, generally accompanied with a fall of dew so profuse as to supply the want of rain."

Now let us turn from the El Dorado of heat to that of cold; for if, by some, Nubia is considered, "the finest climate in the world for chest complaints," as Dr. Dunbar Walker, and Professor Flower have said, so is, by others, the perpetual snow of a winter at Davos Platz, Weisen, The Maloja, or St. Moritz,

"It is of the greatest importance," says Mr. Otter (Op. cit.), "that invalids who go to Davos should have a fair reserve of physical vigour to enable them to resist the intense cold which they are almost sure to meet with during some part of the winter. . . .

"Dr. Pope, in his pamphlet, states some useful facts about Davos; and he gives some opinions as to its suitability or otherwise in different cases of disease. . . . He seems to think that, if the heart, brain, and spinal cord are in a quiescent and normal state, nearly every other kind of disease would be suitable for treatment at Davos, and likely to be materially benefited by a residence there. If Dr. Pope had remained longer than he did at Davos, and had watched other cases during the whole winter, I am doubtful whether he would not have had cause to modify his opinion to some extent. There seems to be no doubt that persons suffering from affections of the *heart*, *brain*, or *nervous system* should not be sent to Davos; and I believe it is not considered a suitable place for persons with any serious derangement of the *liver*. It has been said that it is only organic, as opposed to functional diseases of those organs which are unfitted for Davos; but this seems open to doubt. . . . . It is doubtful whether chronic bronchitis, especially in persons of mature or advanced age, is not increased rather than diminished by the dry air of Davos. The place has been found beneficial in cases of bronchitis and asthma in children; but I heard nothing but complaints from grown-up persons of irritation in their throats and bronchial tubes, which caused them more discomfort from frequent fits of coughing, both by day and night, than they ever experienced, even in England.

"There seems to be something peculiarly irritating to the throat in the air of Davos. Many patients who were advised that they were improving steadily in their lungs during the winter, appeared to their friends to be getting worse, by reason of their constant fits of coughing, and, in some cases, almost total loss of voice.

"Many persons who were perfectly well in health, and who were residing at Davos as visitors, complained of constant relaxed and sore throats, which could only be attributed to the dryness of the atmosphere. . . .

"It seems to me doubtful how far the place is suitable to persons who are in that stage of consumption when hectic or recurrent fevers are high and frequent. I saw several cases among my own acquaintances in Davos of this fever, especially during my first winter, and they never seemed to be able to shake it off during the whole time they were there. Nearly all of these persons have since died.

"Others, again, seemed to make steady progress during their residence at Davos, and to leave the place in fairly good health, but they broke down on their removal to lower regions."

"The great drawback to all high Alpine health resorts is *the difficulty of deciding where to go when the great snow-melting begins* in April, and when it is generally considered that the climate becomes unhealthy for invalids." . . .

"Davos is, however, a difficult place for an invalid to get away from during the winter if he finds the place unsuitable for him." . . . (pp. 220—34.)

"The Föhn wind, which answers to the Italian Sirocco, is a hot and exceedingly dry wind. . . . Most travellers have felt the evil effects of this wind—under whatever name it goes—in the South of Europe. It is especially bad in Naples, Rome, and Florence, and along the Riviera, where it is so much dreaded by invalids. Dry though the wind is, it almost always *leaves behind it signs of dampness* on the pavements in the streets, which is accounted for on the supposition that it takes up the moisture from the Mediterranean in its passage across the sea, and deposits it on the land in its northward course. . . . This wind is often felt strongly in Switzerland. . . . It is impossible to shut the Föhn wind out entirely by any barriers, but it is obvious that its force may be broken by sufficiently high mountains, and that some of its most pernicious effects may be mitigated by passing over a large region of snow. This is one of the advantages which is claimed for the Valley of Davos. The Föhn is felt — and sometimes felt strongly—there; and I have not hesitated to state the bad effects which it produces; but I know of no part of Switzerland which is more free from it, nor where its effects would be likely to be less pernicious.

"The usual period of its continuance is three days; it sometimes extends to the fourth day, when the wind generally makes a sudden shift to the north, and brings on a snowstorm, and subsequent change to fine, bright weather.

"The longer and stronger the Föhn wind blows, the worse, of course, are the ill effects to the invalid; and to these must be added, when a thaw sets in, the great additional chances of colds and catarrhs and their attendant evils; and the greatest precautions must be taken to avoid them." (pp. 197—9.)

In speaking of the drawbacks of Davos, Dr. Wise ("Davos Platz, and the Effects of High Altitudes on Phthisis") says:—

"Any remarks on the climate of Switzerland would be incomplete without reference being made to the Föhn wind.*

"The nearest Föhn station to Davos is Klosters, which is 1,700 feet below. Nevertheless, the wind frequently makes its presence felt, and mars the full benefits of the winter season, as in the winter of 1878, and the greater part of last winter (1880-81), during which rises in temperature, with dampness, limited the number of enjoyable days, and gave rise to the dangers of contracting catarrh or bronchitis." (pp. 47, 48.)

"When the snow-melting begins it is advisable for patients to quit these places, to escape the bad consequences of a universal thaw."

"Greater attention might be paid to sanitary arrangements within and without the hotels, and some satisfactory plan of ventilation might be adopted." (Wise, pp. 40, 41.) (See a letter on "Insanitary Sanitaria, by R. D. H. Gwillim, M.R.C.S.," Chap. IV., p. 119.)

In Chap. IV., p. 120, I have quoted an important remark on this subject by a patient who had spent two winters at Davos.

But those who do not like to risk the Swiss winter have the choice of the cold dry inland air of Minnesota, so much thought of in the United States.

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* Föhn.—"When the wind, coming in from the sea, and therefore charged with moisture, meets a mountain chain, it is forced to rise; it is cooled by rising, and made to give up much of the vapour it brings with it in copious rains. The result is that the air is rendered dry and cold. If now the average height of the cols of the chain, above the plain country beyond, be some 4,000 feet, the air in its descent may receive an increment of temperature of over 20° F.; and as at the same time its capacity for containing moisture will be increased, it will be felt as *a dry hot wind.* This is the explanation of the characteristics of the Föhn of Switzerland." (Scott, Op. cit., p. 289.)

Of this Dr. Brewer Mattocks, in his charming little book Minnesota as a Home for Invalids," says:—

"Now to sum up the characteristics of our climate. First, the climate of Minnesota is dry—it is dry of necessity—we are so far from large bodies of water that we are but slightly subjected to their influences. For the past thirty years our annual rainfall has been but twenty-five inches, including snow; we have also but little foggy or misty weather. On the Atlantic coast the rainfall, large as it is, is of little moment compared with the fogs and heavy dews. . . .

"The annual mean temperature of Minnesota is 45°, equal to that of Scotland. The *annual* mean of a climate is of comparatively little importance in determining its characteristics, or in giving an idea of its different seasons.

"Many ardent admirers of our climate, who, seemingly, are grateful to Minnesota for the restoration of their health, speak of this State as a sort of paradise, as a climate not subject to changes, with no winds—where it is almost impossible for one to die, etc.! On the other hand, many poor invalids, melancholy and desponding, worn out with their sufferings, and almost weary of life, remove the silvery lining from our clouds, and, in their stead, bring into prominent relief the dark and lowering clouds of a Minnesota storm, which now and then breaks upon us with a most fearful fury, or a day in mid-winter with the mercury below the zero mark; or they dwell with dolefulness upon the sudden changes in temperature, which are not infrequent.

"If we were called upon to say which of these pictures was correct, as a truthful witness, we should say both. It does seem to us sometimes as if 'the north star shore' was the playground of the elements. We often have changes of temperature, yet they are powerless for evil if the atmosphere contains no moisture; but on the other hand, how disastrously does a sudden change affect the dwellers on the coast. . . .

"In concluding this chapter we would say that whoever expects to find *a Paradise* in Minnesota, so far as climate is concerned, will be woefully disappointed: . . . . on the other hand, if one comes to Minnesota prepared to meet a cold inhospitable climate, unpleasant and trying, such a one will be agreeably disappointed." (pp. 87—9.)

It may be thought that in selecting the CONTINENT OF EUROPE for our change of climate we are at last on safe ground and free from the chance of serious drawbacks; even if it is regarded as a compromise by the advocates of extreme heat or of extreme cold.

But unfortunately there is "no rest for the sole of the foot" even there, as the following extracts will suggest.

"I may mention," says Mr. Otter, "three cases of gentlemen who left the hotel in which I resided at Davos before the end of the first winter, one for San Remo, another for Cannes, and a third for Arcachon. The first said that he was confined to his hotel at San Remo for nearly a week immediately on his arrival by a strong mistral; and that the first time he went out afterwards he caught a bad inflammatory cold which confined him to the house for a fortnight. The second said that he had only been once out of his hotel at Cannes for nearly three weeks on account of the biting winds, and then only for about twenty minutes, and he intended to go forward to Mentone in the hope of a change for the better; and the third said that the whole country in the neighbourhood of Arcachon was under water and enveloped in a thick wet fog." (Op. cit., pp. 186, 187.)

H. M. writes ("Sketch of Arcachon," by a Lady, 1882):—"This year *some say* it has been 'exceptionally foggy,' fog being seldom seen here; the last year we inquired after was 'exceptionally rainy.' When our lot was cast in the Riviera it was 'exceptionally cold,' and the lemons and olives were declared in danger. Our friend at Pau found 'hard frost and several inches of snow' his *exceptional* experience there; our friend from Davos wrote 'there has been a thaw,' and that is the dreadful *exception* there, 'a phenomenon that has not occurred for twenty years before.'" (p. 15.)

January, 1881, a patient wrote to me from the Riviera :—

"We arrived here three weeks ago, and I saw Dr. —— at once: . . . . he strongly advised me to leave the Riviera, as the lungs were quiescent, and my nerves, digestion, etc., were being much disturbed by the climate. He wished, however, to have your opinion, and I requested Dr. —— to send on your letter to him. After reading your account of me he advised me not to move till the end of February, and then to go to Arcachon. Whether I shall be able to bear the climate so long I do not know. I am able to digest less and less. . . . *I am far worse here than in England.* . . . Dr. —— considers that this climate acts like poison upon me, though working like a charm on many. I shall be glad to hear what you think about the move across France at the end of February. . . . . It is very cold here now—snow on all the hills; but I prefer it to the relaxing heat we have had till lately."

March, 1881.—A patient, writing from the South of France, said:—"I am now worse than I have been since I *first* saw you. . . . I have been continually in bed. . . . Kept for four weeks on peptonized milk gruel, with a little fluid meat. The consequence is that I have wasted dreadfully, ... and we have, after all this wasting and weakness, got no improvement. . . . . In fact, now my stomach refuses to digest solid food. . . . The Doctor thinks, with me, there is a strong climatic influence against me. . . . I shall hope never again to go out of England in the winter. I have been shut up here for *three months*, and I feel sure that with the care you give to my case, and the comforts of an English life, I shall make as much fight for life as it remains in me to make."

At p. 10 I have quoted from a letter of a doctor, who detailed his misadventures in travelling with a patient through France; and, at p. 11, one from a medical friend who could not find anything insanitary in Spezia; and I then quoted from the "Times" leader of September 11, 1884, on the state of affairs at Spezia and other continental places, which concluded with these words:—

"Whether all this by itself can produce a definite type of disease may be an open question, but there is no doubt that if the germs of disease are present, these are precisely the conditions required for their propagation. . . . When the bad drainage, the polluted water, and the general uncleanness which predispose to disease are dealt with as effectually abroad as they are by ourselves, epidemics will be shorn of their terrors, and the soundness of our methods of dealing with them when they come will obtain the recognition now denied."

In the "British Medical Journal," November, 1882, Dr. C. J. B. Williams, F.R.S., writing from Cannes, says:—

"On the 4th of February last, at the request of the English physicians practising at Cannes, I made a statement in the 'British Medical Journal,' respecting the cases of typhoid fever which had occurred there during the preceding season, and which had been the subject of very erroneous and grossly exaggerated reports in several public prints.

"The total number of cases did not exceed forty-five, in a population of upwards of 24,000. No new cases had appeared for several weeks; and Cannes continued to be remarkably healthy during the remainder of the season.

"During the summer, except five cases of typhoid fever which occurred in the month of July, near the railway station, there has been no return of the malady; and both town and neighbourhood have been, and now are, quite healthy.

"In my former paper I also stated that, after careful investigation of the causes of this outbreak of fever, it was traced, in almost every instance, to sundry faults and defects in drainage and other sanitary arrangements, which could be effectually corrected; and that the Mayor and Town Council were prepared to adopt and carry out to the utmost the suggestions and advice which the medical men of Cannes, in consultation, had laid down on the subject. I have now to report a summary of the work done, and of the measures still in progress, to remove and counteract all causes of insalubrity in Cannes and its neighbourhood. . . .

"Various endeavours have been made, and are still carried on, to prevent the contamination of the *ruisseaux,* or streamlets, one or more of which run down the valleys between the numerous little rocky hills on which Cannes stands. These little brooks carry off the surface water, and, in the rainy season, convey a considerable stream, which, in some places, is used by laundresses for washing linen. In dry weather they cease to run, and the water, stagnating in pools, is apt to become offensive, especially if containing soap-suds. . . .

"But a more serious cause of contamination of these streams has been the too common, although illegal practice, of allowing drains from kitchens, and, what is worse than all, from cesspools, to be discharged into them! If I were asked to point out the most potent cause of insalubrity in Cannes, I would answer, without reserve, the escape of the contents or effluvia of cesspools into the houses and into the *ruisseaux.* Individual houses are poisoned by the leakage of cesspools under or near them, or by the entrance of their effluvia through inefficient waterclosets, or through untrapped, imperfect, or unventilated soil-pipes, leading from the closets to the cesspools. But if, by overflow or leakage, through neglect or design, the contents of cesspools are discharged into an open *ruisseau,* the offensive matter defiles the stream, which diffuses its stench and pernicious effects throughout its long meanderings, with aggravated activity where it lingers or stagnates in its course. . . .

"Strangers may ask this obvious question: 'If the cesspools in Cannes are the chief cause of evil, why not abolish them altogether, and substitute main-drains and sewers to every house, as in England?' This would be too gigantic an undertaking as a complete system, requiring more time and cost than can be afforded. In the town of Cannes, which is compactly built, such a plan may be feasible, and is actually contemplated; but, for the numerous villas and hotels scattered around it, to a distance of many miles, with all kinds of irregularities of surface, the expense of a complete system of drainage would be enormous. But for the central and more closely built parts of the town, the construction of sewers and main-drains has been actually commenced. During last summer a new drain was completed along the boulevard de la Croisette, and another in the rue d'Antibes, and these are to be extended to West Cannes in the following summer, when it is intended to convey the sewage in cast-iron pipes into the sea, at a point four kilomètres distant from the town, called the "Trou de l'Ancre," where there is a depth of eight or ten fathoms, and a current from the river Siagne outwards into the open sea.

"In the meantime, till the proposed plan of drainage comes into full operation, the aid of cesspools remains necessary; and they may be made quite safe and effective, if of adequate size and careful construction, with strict provision for their being regularly emptied and cleansed, and the most absolute prohibition enforced against their ever being allowed to defile the streams.

"In the case of villas and hotels, with a garden of some size, there is no difficulty in disposing of the contents of the cesspools. Once or twice in the year, or oftener, if necessary, they are to be poured into trenches of sufficient size, and covered with a depth of eighteen inches or more of earth. This effectually deodorises and disinfects the sewage, and appropriates it to the fertilization of the soil. A great mistake, commonly made here, and still more in Switzerland, is to spread the sewage-matter on the surface of the ground without burying it—so poisoning the air with its fœtor, and impoverishing the manure in its fertilising properties. The adoption of Moule's earth-closet system would supersede cesspools, water-closets, and their nuisances, altogether; and would be, for the outlying villas with gardens, the best possible supplement to an improved drainage of the town of Cannes.

"For villas without gardens, and houses in the town, the best present means of emptying the cesspools is by the steam-vacuum carts, supplied and worked by a company during the last few years. These are quite successful in pumping out the contents of cesspools; but there has been some difficulty in disposing of the sewage thus extracted. At present, it is thrown into the sea beyond the port; but probably it will be arranged to discharge it into the sea at a greater distance, where it is contemplated to carry the contents of the sewers.

"This, and many other measures for the better securing the salubrity of Cannes, are under the serious consideration of the Commission d'Hygiène; and to show that, in addition to what has been already done, the Mayor and Council of Cannes are ever anxious to do their utmost to promote the health and comfort of the visitors, I will mention a few further facts in conclusion.

"During the summer, the Mayor visited Paris, London, and some other parts of England, for the purpose of obtaining the best and most recent information on the subjects of drainage, disposal of sewage, etc.; and to witness the results of different systems in actual operation. Since his return, M. Gazagnaire has consulted by letter M. Pasteur on the question of the disposal of sewage. M. Pasteur condemns, 'without reserve,' the plan of disposing of sewage on gardens or lands in the vicinity of towns. He approves of the discharge into the sea; but recommends that it should be carried by an iron tube eighty or a hundred mètres from the shore.

"In addition to the Commission and Bureau d'Hygiène, there has been formed an independent Vigilance Committee, consisting of some of the most active and influential inhabitants, to consider questions of interest to the town, and to give advice in all matters relating to sanitation. Also, an English civil engineer, familiar with sanitary matters, has been requested to visit Cannes, to assist the municipality in their efforts to improve the town.

"While closing this epitome of our abundant corrective and precautionary measures with the announcement of a present clean bill of health, and finer weather than we have had during the whole summer in England, I must not omit to warn travellers not to linger in Paris, where there is at present a real epidemic of typhoid fever, with between seven thousand and eight thousand cases, and two hundred and fifty deaths, during the last week."

In the winter of 1883-84, Dr. Williams's distinguished son, Dr. Theodore Williams, was laid up at Cannes, dangerously ill of typhoid fever (from which happily he recovered), the poison of which he had imbibed on his route between England and the Riviera to pay his father a Christmas visit.

In his recent work on San Remo, Climatically and Medically considered (1883), Dr. Hassall says:—

"It would appear that diseases of the organs of digestion are somewhat rife; and this is not only so in respect of San Remo, but the whole of the Riviera, and probably all South Italy. From some of the milder forms of that complaint, visitors are by no means exempt. . . .

"Visitors, especially new comers, sometimes suffer from quinsey, and if they were subject to it before coming here they would be very liable to a fresh attack. . . .

"Diarrhœa is very common in the early part of every season, if the weather is warm, and among those who are carried away by their appetites and eat more animal food than is suited to the climate. It also occurs sporadically *at all* times amongst new comers. Perhaps it may be partly a result of chill, from want of acclimatization, and proper protection of the skin. The testimony of Dr. Siordet, of Mentone, is to the same effect. The diarrhœa of new comers is often due to fatigue and sudden change to comparatively warm weather, quite as much as to carelessness. . . .

"From the statistics given and testimony to the same effect from other quarters, it may be concluded that the Riviera is not well suited for chronic gastric, and hepatic affections. . . .

"According to Dr. Barέty . . . . at Nice the sea disagrees with all in whom there is either a disposition to dysentery or biliary catarrh, or congestion of the liver. Persons coming to the Riviera are very apt to suffer from constipation, and those in whom constipation is habitual are liable to have it aggravated, particularly in the absence of care and discrimination in diet and regimen. This constipating effect is due mainly, I believe, to the stimulant and tonic effect of the climate, but in a less degree, also to the water consumed, much of which is very hard. . . .

"But other causes doubtless play important, probably a more important part, in the production of these diseases (of the organs of digestion). One of these is the warm and stimulating character of the climate; but another, and I am convinced a very fertile cause of mischief, is a very general absence, in the houses of the poor, of those conveniences which, in most countries, are deemed essential to comfort, cleanliness and health. The few conveniences in the town itself are wholly inadequate, and they are, for the most part in public and objectionable situations. Again, other causes are the sunless streets of the old town, and in winter insufficient clothing. . . .

"As might be anticipated from the stimulating action of the climate and the consequent increased cutaneous elimination, affections of the skin are by no means infrequent. . . . .

"The great brilliancy of the light and the penetrating power of the sun's rays are apt to affect the eyes, and to overstimulate and fatigue vision. . . . .

"Occasionally, and especially in irritable gouty subjects, a congested state of the conjunctiva is brought about. . . . .

"The fact should not be forgotten that persons who have spent the winter in a climate such as this, are, for a time, still more susceptible to the effects of cold weather than they would have been had they not come here at all." (pp. 227—241.)

Dr. Baréty, in his charming little book on "Nice and its Climate" (before quoted), which Dr. Charles West has translated and enriched with notes (1882), says:—

"February is, in many respects, a less agreeable month than January; it is more liable to sudden changes of temperature, and unpleasant winds are more frequent. . . . In eight years, out of twenty-eight, there was a prevalence of high winds for from ten to sixteen days. Lastly, it is the coldest month of the year, and on February 14th, 1854, the thermometer at sun-rise stood as low as 25·28° Fahrenheit. . . . .

"March is usually dry and windy, and its temperature is variable. . . . .

"April still shows a little of the changeable character of March; still, this month is usually one of the pleasantest of the year. . . . .

"The light at Nice is so bright as often at first to weary the eyes of those who are unused to it; and this inconvenience is increased by the glare of the white houses and of the roads, which are dusty in spite of their being well watered. . . . .

"The patient who passes restless nights on the borders of the sea may obtain quiet sleep at Gairaut, or at many places between these two extreme points of north and south. There can, indeed, be no doubt, that the *over-exciting influence of the Nice climate*, of which some have complained, is limited to those persons whose nervous system is very excitable, and who have, by mistake, taken up their abode on the sea-shore. . . . .

"People who take up their abode at Nice require, as do strangers on arriving at many other places, to become acclimatised to it, a process which, according to the various peculiarities of their constitution, their health, and even their nationality, sometimes requires a longer and sometimes a shorter time. . . . .

"It happens not very rarely, especially in the case of those who journey rapidly to Nice from some long distance, that on first arriving they become sleepless, lose their appetite, grow irritable, complain of a sense of heaviness in the head, while their conjunctivæ become injected, doubtless from the brilliant light, and some persons even complain that their sense of hearing is less acute than usual. . . . .

"The same class of discomforts, too, is sometimes experienced by others after a prolonged stay of from three to six months at Nice, as though their constitution had become saturated with the peculiar influences of the climate. In such a case it is always desirable to advise the patient to go to some other place in France or Italy, lest he should lose the benefit of his stay at Nice." (pp. 25—46.)

A medical man from London, who determined to go with his family to reside at Hyères, wrote to me (January, 1880):—

"You were right in your feeling about Hyères. . . . At the end of December my eldest girl fell ill with typhoid, due to the fearful stenches met with at every turn. . . . The week before I had observed that, what with the quantity of organic matter I had discovered in the water, and the pollution of the air, every one in the place *ought* to have typhoid fever. When my own anxiety arose, I was told that the son of a French doctor was lying in a critical state with it, and that, in fact, it was never absent from the place."

October, 1880, a patient wrote from Hyères as follows:—

"The journey from Paris to Marseilles was dreadful. although we were in a wagon-lit (a sort of American sleeping-car); as the sleeping-cabins are not six feet square one has to leave the door open. A Frenchman smoked five cigars not two yards from my head, and when I told him I was ill, and it made me cough, with that 'politeness' which distinguishes the gilded youth of Paris, he expressed his profound regret that I was ill, and infinite sorrow that his cigars annoyed me, but nevertheless *continued to smoke like a chimney* all night. . . . I feel the air very stimulating to my heart, but I have always felt this air trying for nerves and heart. . . . Hyères is the least stimulating of these stations. . . . This hotel stands on a hill two miles from Hyères, isolated in a pine wood, two miles from the sea; there is a clearing round the hotel, and we get plenty of sun and air; the sanitary arrangements are excellent, and there cannot be the most distant dream of drains *up here.* I want you to let me stay here for the present. . . . I do not ask even to drive into the town, but to remain up here! . . . Each day brings people imploring to be taken into this hotel, and complaining of the smells in Hyères."

The patient whose letter about Davos, I quoted at p. 120, says in the same letter :—

"My second remark is about the much maligned mistral in the Riviera. It seems impossible to disabuse *Doctors* of a misconception as to this *turbulent but healthful wind.* A house, on a high level and facing the mistral, is a house in a good situation; the next garden round the hill may be in a bad one. The true danger is the easterly sea-wind, which tries the nerves and is treacherous in the extreme. I spoke of this on one occasion to the manager of a large hotel in Cannes. 'You need not speak to me,' he said: 'when the mistral blows, my *table d'hôte* is full; when the wind is in the east, I begin sending dinners to the bedrooms.' That is good lay testimony. I would go a little further; it seems to me even dangerous to send patients to the Riviera, without special hints; the climate on one side of a hill is not the same as the climate on the other; and the climate in the valleys, above all where there is any wet, is, I feel sure, to be avoided.

"P.S.—Are *Doctors aware* of the far greater amenity and gentleness of the climate of Hyères, as compared, at least, with Nice and Monte Carlo? Hyères has that advantage, but it is butchered by a vile town government."

Speaking of Pau, Dr. More Madden says (Op. cit.):—

"There is a difference here generally of 10° or 12° between the north and south side of the same house, and the nights are always, and the days generally, cold enough to render a fire necessary in winter. In most of the houses the sewerage is very defective, and the effluvia in the hall and staircases, especially in wet weather, may be better imagined than described.

"The climate of Pau has been written up very assiduously, and highly extolled for its peculiar advantages during eight months of the year. . . . . Still the climate remains what it was before the books were written—essentially cold, variable, damp, and dreary during the winter. I should feel some hesitation in offering so unfavourable an opinion of this climate . . . . if I had not had some personal experience of its action on invalids in whom I was interested. Moreover, I have been favoured with very extensive unpublished meteorological and other observations, (a *résumé* of which is given). . . .

"Pau is one of the most variable climates in the south of Europe. Thus, for instance, I have seen a difference of 20° between nine a.m. and noon. . . .

"There is here a peculiar stillness of the atmosphere, and generally a great freedom from harsh and violent winds, which is especially obvious in spring.

"This, though in some respects an advantage, is not an unqualified one, the stagnation of the air giving rise to a weak and languid circulation, generally accompanied by a corresponding state of mental and physical relaxation and inertia. . . .

"Rheumatism is a common complaint here. . . . .

"The variable temperature of Pau renders that town unsuited for the winter residence of consumptive patients in whom the disease has progressed to its second or third stage. It would be a bad abode in most cases of chronic bronchitis; and, according to the testimony of an eminent resident physician, peculiarly unsuitable in cases of fatty degeneration and certain other chronic diseases of the heart.

"With regard to asthmatic patients I must, however modify what I said in my first work on this subject, as further experience has convinced me that in many cases of spasmodic asthma Pau agrees better than any other climate." (pp. 70—78.)

Dr. Madden has a very high opinion of Malaga as a winter health-resort, and says in the work just quoted:—

"Malaga is one of the best winter resorts in Europe for consumptive patients requiring a warm, dry, tonic climate. I have had great reason to speak favourably of this place, not only from my own personal experience of its benefits some years ago, during three winter seasons, but also from a considerable number of cases in which I have since then recommended this climate with advantage." (p. 29.)

Nevertheless Dr. Madden finds some drawbacks even at Malaga:—

"Fire-places are generally unknown here, their place being supplied by the *braseros*, or pans of charcoal, which are but a poor substitute for the cheerful blaze of an open fire; and the invalid, on those few occasions when he may feel inclined to regret the comforts of an English fireside, will do well to wrap himself in his cloak, or retire to bed, rather than sit poisoning himself over the noxious fumes of smouldering charcoal.

"With respect to the living, it must be admitted that the meat in Malaga is very inferior in every respect to that used in this country. The fish, however, is so good, and of so many various kinds, as in great measure to make up for the shortcomings of the meat, and invalids may manage to live very well and very cheaply at the hotels on fish, kid, poultry, game, especially partridge, which is a standing dish here, even if they do not choose to venture on the meats served at the *table d'hôte.*"

"Spanish cookery is generally considered as intolerable by British travellers, but I think this is mere prejudice, and the garlic and oil which enter so largely into all culinary operations in Spain are absolutely necessary (moderately used) to supply the place of fat and of flavour in the meat, and to render it digestible. . . . .

"There is often a difference of 10° in the temperature of rooms facing the Alameda, and those at the back of the hotel. . . . .

"A pulmonary invalid should recollect the Italian proverb, 'Where the sun does not enter the doctor must.' . . . .

"The hygienic condition of Malaga is as defective as it can be. . . . .

"The connection between defective hygiene and epidemic disease has been too well illustrated in Malaga, which has been repeatedly devastated by plague, yellow fever, cholera, and other zymotics. . . . .

"The prevailing winds are the east, or *levante*, which is cold and humid in winter, the north-west, and south-east.

"The north-west wind, or 'Terral,' is termed, '*un viento fatal.*' It rushes through a gap in the Antequera Mountains, along the valley of the Guadalmedina, and arrives in Malaga, laden with fine sand, which irritates the pulmonary mucous membrane. In summer this wind is hot and dry, giving rise to a highly irritable state of mind and body. In winter the Terral, sweeping down the snow-clad mountains, is intensely cold as well as dry. Its ill-effects, however, cannot be measured by the thermometer alone; for the force and rapidity of its motion, its aridity, and the quantity of impalpable sand it suspends, all combine with its low temperature to injure the valetudinarian visitor, who should, therefore, be forewarned to remain within doors as long as this wind prevails, which, fortunately, is seldom more than three consecutive days." (pp. 29-37.)

Dr. Tanner's work on "The Practice of Medicine," edited by Dr. Broadbent (1875), speaking of Malaga, says :—

"The principal drawback seems to be the *Terral*, a cold, harsh wind from the north-west, which occasionally blows during the winter with great force. It causes restlessness and oppression at the chest where there is any pulmonary affection. The air is also unfavourable in cases of diseases of the nervous centres." (Vol. II., p. 611.)

In 1881, a patient wrote to me from Arcachon, "You have heard from Sir John Rose Cormack of my mishap in Paris—of the severe congestive cold I caught in travelling, which laid me up *en route*, and how, but for his interference, I should have been turned out of the hotel late at night because I burnt a kresoline vapouriser in my bedroom, and the hotel keeper said it made the place smell of phenic acid, and would frighten away his customers.

"We started from Paris November ——. I was carried under a blanket and never breathed the open air at all, and thus got here without any more mischief occurring. It was very cold in Paris, we arrived here to find the temperature 72° in the shade, we have a most comfortable villa and our own servants. I think the air is PERFECT, it is as good as digitalis for my heart. I am quite charmed with it. . . . My right lung is a little active, and there is some irritation in the left. . . . I have not yet recovered the fatigue of the journey."

In January, 1882, the same patient wrote, "At first I did very nicely, and got over the relapse in Paris as well as could be expected, but I fear that this most delicious climate, though beneficial to the lungs, is going to cause me serious trouble with the *liver*. I have been very unwell the last month, unable to eat or digest. . . . Skin very yellow, eyes ditto, and dark liver spots on the body and limbs, which are a new feature. . . . Doctor —— says that patients with hepatic complications do not get on here. . . . After the attack in Paris, a new spot under the *left* arm corresponding to the bad spot on the *right* lung set up a little activity. . . .

February, 1882. "My liver is terribly obstinate, and I have to diet in a manner that must ultimately be weakening. . . . I cough a good deal at night, and have fits of coughing in the day, the expectoration is of a bad colour . . . . and occasional traces of blood. . . . . I have grown very thin. . . . In fact this last month I have not been doing well. . . ."

Speaking of the drawbacks of Italy, Dr. T. King Chambers says,* "These natural advantages are in some places outweighed by accidental circumstances, and sometimes by man's mismanagement. Thus at Genoa, there are in the amphitheatre of hills some high snowy gaps, which let in icy blasts right down upon the town in winter, while the high houses shut out all sun from the narrow streets. Florence is open to the same objection, from standing up high in the Val d' Arno, in a sort of gully towards which the winds from the hills converge; and the majority of its streets are like Hanway passages bordered with Newgate prisons. A great inconvenience also to invalids are the frequent floods of the river, caused by the emptying (for the purpose of gaining land) of the highland lakes, which acted as regulating reservoirs, and whose removal makes the Arno practically into a gigantic mountain torrent.

"Naples, again, sits in a pool of her own excrements [horribly confirmed during the cholera epidemic of 1884], opening towards the east, and exposed to the cold winds blowing from that quarter over the snowy Apennines, which are just far enough off not to shelter the town. The marshes from Civita Vecchia to Cape Miseno render their neighbourhood uninhabitable by all but those whom stern necessity forces to cultivate the soil; and again from near Salerno downwards, the same cause drives away the traveller. . . . . At Rome, also, the malaria is mastering man's endeavours to live cheaply in his forefathers' habitations without the trouble his forefathers took to make them habitable. It is year by year more unhealthy." (pp. 65-67.)*

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* "Some Effects of the Climate of Italy." By T. King Chambers, M.D., Hon. Physician to the Prince of Wales, etc.

In *The British Medical Journal*, March 29, 1884, Mr. Ernest Hart wrote concerning Rome:—

"Looking only, as a pilgrim in search of personal health and not uninterested in sanitary questions is bound to, at the sanitary aspect of the subject, it must be confessed that a visit to Rome, even in the spring, is not without risks, which must be counted with and avoided.

"The mortality of Rome is not so high as that of Naples or of Nice; its inhabitants are alleged by common report of doctors of all nations to be relatively free from typhoid, and the chief sufferers from intermittent and pernicious fevers are the poorer class of inhabitants and the immigrants into the Campagna, and from the Campagna into Rome. Nevertheless, it is beyond question that typhoid levies a rather heavy toll upon visitors, and that not unfrequently hotels of a sumptuous character, and having all the domestic fittings which promise immunity from the diseases bred of the emanations from the sewer, yet rarely see a season pass without many fatal cases of enteric illness among their guests. It is said that residents in apartments are less liable to attack. This observation has been made to me more than once, by competent persons of experience. It is anomalous, and I cannot suggest an explanation. What is the meaning, and what the lesson of the liability of visitors to Rome, and particularly British and American visitors, to enteric disorder? All new comers in a district or locality in which typhoid is in any degree endemic, are known to be more susceptible than residents; and the chronic endurance by Romans of stenches and sewer-effluvia which would turn the stomach of a less hardy Briton, may have ended in producing an immunity bred of customary influences. But this difference of constitutional susceptibility, if it exist, is not an element of reform. That which concerns the hotel-keepers is to take steps to exclude the poisonous sewer-gas from the corridors and apartments. Is there an hotel in Rome in which the soil-pipes are properly ventilated and disconnected from the sewers? Is there one in which the main ground-pipe terminates in a man-hole, and is flushed by an automatic flushing-tank? I am inclined to believe there is not. Most of the best and newest hotels are indeed provided with excellent cabinet fittings, but this is delusive and incomplete unless the ventilation and disconnection of the soil-pipes are carried out. This is the more important in Rome, because the main sewers are mostly of a labyrinthine character and Brobdignagian proportions. In some places they are connected with the vast ancient cloacæ, and it is certain from their form and size that they must be very largely elongated cesspools of deposit rather than sewers of transit. Under these circumstances, it is conceivable that the more modern and complete domestic arrangements for water-carriage adopted in the hotels become sources of danger by providing also for a more abundant reflux of sewer-gas, which the heating of the corridors sucks into the atmosphere and disperses throughout the building. . . . I hesitate to inflict an injury, and fear to commit an injustice by entering into details; but I could give particulars of hotel-epidemics of a startling and very serious character which came to my knowledge in Rome." (p. 643.)

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* See also Dr. Chambers's advice, quoted at p. 161.

After the worrying and perplexing revelations and complaints about many of "the most delightful places under the sun," contained in the preceding pages of this disagreeable chapter, let us turn for a little refreshment to the following satisfactory case and to the quotations I have made regarding the queer regions in which the patient obtained such excellent results—only shadowed by the "drawback" of the abominable amount of travelling required to reach the necessary health stations; and, perhaps, by a lurking suspicion that the doctor's accounts may be unconsciously infected by the American epidemic which they call "Raising the Boom!"

Case XLIV. November, 1878. I was consulted in London by an eminent physician about his only daughter, æt. 16, and I found: "Consolidation and disintegration of the upper part of the left lung; severe recent catarrh in the lower half of right. Heart normal; some loss of flesh; temperature, 99·5 to 101·0; considerable debility. History of severe cold two years ago, with cough, which had never been quite absent since." She was said to "get nearly well and then catch cold again and fall back, losing ground on the whole." Last cold caught in Paris, September (1878) of which the state when first seen by me was the outcome. Being a physician's child, and an only daughter, it is needless to say she had everything done for her that love and medical skill could suggest; but she moved in a good deal of society, and each time the lung disease became passive, and her general symptoms promised a cure, some mishap occurred, which set up fresh activity.

In 1879 she went to Guernsey; in 1880, to Algiers. On returning from Algiers, May, 1881, she was not in a satisfactory state; she had suffered from several fresh colds, and the excavation of the left lung was extending; general condition lax and feeble, although she had lived much out of doors. At the close of summer an excellent opportunity occurred for her going to New Mexico in company with wealthy friends, with every luxury of travel and care, both in travelling and after arrival. She got out well, and we had flourishing accounts of her progress, when, in consequence of a sudden accident in her friend's family, they were obliged to return, and not liking to leave her behind, she was brought back to London, most unfortunately in the middle of November, 1881, having travelled "cannon-ball fashion" the whole way. Nevertheless, she was so much improved in general symptoms, appearance, and fat, that she seemed quite well, and had not felt fatigued by the tremendous travelling. All lung symptoms were quite passive, the cavity dry and creaking.

It was determined, therefore, to take the first good opportunity of sending her out again, this time to stop as long as seemed advisable. She soon began to lose ground, as usual in London, in spite of all care; and her father knowing a medical man who had a private home for invalids in Colorado, we sent her there under his care.

The following quotations from her letters to me will indicate how satisfactorily the arrangement turned out.

January, 1883, she wrote: "I send you a prospectus of this place:—

ELKORN, LARIMER COUNTY, COLORADO, U.S.A.

Resort for Invalids in the Rocky Mountains,

UNDER THE MANAGEMENT OF

G. A. NORMAN, M.B., Oxon. (MARRIED).

Altitude 7,500 feet. Specially suitable for the early stages of Phthisis and for Asthma. Owing to the dryness of the climate patients can remain throughout the year, and there are few days, even in winter, when they cannot take outdoor exercise.

TERMS—THREE AND A HALF GUINEAS A WEEK.

ROUTES OF TRAVEL—

1.—By New York, St. Louis, or Chicago and Denver; or by Chicago and Omaha, direct to Fort Collins.

2.—By Quebec, Montreal, Chicago, and Denver.

Denver to Fort Collins, 4½ hours by rail; Fort Collins to Elkhorn, 8 hours by stage.

Expenses from New York or Montreal do not exceed £20. Duration of journey five days. Best time for going out, end of April or beginning of May.

HOTELS RECOMMENDED—
At Chicago—The Tremont House.
,, *Montreal*—The Windsor Hotel.
,, *Denver*—The Windsor Hotel.
,, *Fort Collins*—The Tedmon House.

"I am getting on very well indeed. I am ever so much stronger, being able to take walks over hills and dales of three or four miles without any fatigue. I rarely cough in the daytime, except on very cold days. My coughing fits are limited to bed-time and getting up, but even then there is very little phlegm. My appetite is good, and I think on the whole I have taken a big step in the right direction. . . .

"We are having a very much colder winter than usual, but I always manage to get out for an hour or so before lunch. . . . Occasionally we have the loveliest warm days, and these quite make up for the cold ones. . . . Last week Mrs. N. and I were sitting in the verandah for a good part of the day, and I walked for three hours. . . . We hope, however, that the cold weather will not last further than six weeks more (March), when we shall have the spring beginning. . . . I am very sorry for the poor people in England. I only wish they could all come out here, for the climate is certainly beautiful. . . . For those who have plenty of money to spend, I should advise a stay of three months at Las Vegas (New Mexico), from Christmas to the end of March, as these are the least pleasant months here."

"Elkhorn, April, 1883.

"I think I am still progressing in the right direction. . . . You are quite right in thinking I shall not be exactly happy at your opinion that I ought not to return before 1885, but still that is an improvement upon a letter from one of my friends, who says she does not think I ever shall be able to live in England again. . . . I cannot lose my cough entirely.

I think I want a little change of scene. . . . We have had six weeks of lovely weather after six weeks of horrid weather, and now the spring rains and snows are due. We often have snow on the ground at breakfast, which is nearly gone by lunch. . . . I have now been away nearly ten months. I shall be very glad when the summer comes. . . . Papa's accounts of the weather in London have been most depressing."

"Denver, Colorado, April, 1883.

"I have got my change of scene, and it seems to agree with me very well. I eat well, and have not coughed quite so much. I am going to stay here a fortnight, and then go to New Mexico and see what it will do for me. I expect you will already have heard from Dr. N. He told me he would write yesterday."

Dr. Norman's report confirmed that of the patient as to the great improvement in her general condition, her health and nutrition being good, and stated that the physical signs were quite passive, so that in all but a slight cough she appeared well.

There is much reason to hope from the most recent experiences that Colorado and New Mexico may solve the problem how to obtain the advantages of altitude without the disadvantages of an Alpine winter in an over-crowded valley. I have, therefore, not hesitated to give the following detailed accounts of districts at present unfamiliar to many English doctors.

Extracts from "New Mexico: its Climatic Advantages for Consumptives, by J. Hilgard Tyndall, M.D. Reprinted from the Boston Medical and Surgical Journal, 1883."

"SANTA FÉ is the oldest city in the United States, being 333 (one-third of a thousand) years old. . . . The location of the city is such as to be sheltered from harsh winds, the situation being one of considerable slope at the foot of a high mountain. Santa Fé is the capital of this territory, and has, like most Mexican cities, a plaza in its centre, and many very beautiful gardens; also a very well conducted hospital. . . . (p. 20.)

"La Mesilla, one of several towns in the Mesilla Valley, a stretch of land in Southern New Mexico, about one mile wide in its northern portion, and spreading out to six miles in its southern.

"Taking our sensations, and not the monthly range for a standard, the air is mild, with a bright sunshine nearly every day in the year. Vegetation does not decay, neither does meat; they undergo *shrinkage,* and dry up to the extent of mummification in dead animals. In the absence of the congregation of many individuals in one locality [see pp. 118—19], we have here some of the true aseptic qualities, from the presence of which we may reasonably hope for repair of ulcerated tissue after a 'line of demarcation' is set up for the destructive process, and the healing process aided by water abstraction and shrinkage.

"This valley presents to the invalid the advantages of a very moderate altitude, varying from 4,000 feet near the Rio Grande to about 7,000 feet in the high ranges of the Guadaloupe and other mountains. The protection of the valley from sharp winds is chiefly to the north.

"In a letter to Dr. W. D. Bizzell, Mobile, Ala. ('Climate of the United States considered with reference to Pneumonia and Consumption,' 1875), Dr. O. H. Woodworth writes from Mesilla: 'Our climate is very dry, mild, and equable; no dew falls; the rainfall is only about eight inches yearly. The elevation of the Rio Grande Valley at this place is about 4,000 feet above sea level. Our winters are very mild and pleasant; of course, we have a few cold snaps occasionally, but not disagreeably so. Snow seldom falls in the Rio Grande Valley, which is bordered by mountains, and when it does it melts as fast as it falls, never remaining on the ground more than an hour or so. Our summers are cool and pleasant; the sultry, suffocating, 'heated terms, of the States are unknown. A person can sleep out of doors (owing to the absence of dew) the year round, except in rainy weather, of which we have, comparatively, very little.' . . . (p. 21.)

"In endeavouring to determine the suitability of New Mexico as a whole for a great proportion of patients suffering from the various forms of pulmonary consumption, we must compare the actual find to the ideal set up at the beginning of this paper on the one hand; on the other, look to practical results actually attained. Elevation—is present all the way. . . .

"Dryness—a mean relative humidity of low per centage, forms the leading feature of climatic advantages according to Vivenot's classification; the following range of degrees of moisture may be set down as representing so many varieties of dryness (saturation, 100):—

"Dry—below and up to 55 per cent.

"Moderately dry—56 to 70 per cent.

"Moderately moist (or moist)—71 to 85 per cent.

"Excessively moist—86 to 100 per cent.

"Referring back to our table it will be seen that the climate is a very dry one. (p. 22.)

"The possibility of a full and unobstructed sun-bath is given in the number of perfectly clear days, which give us not only length of time, but—with such diathermancy of the atmosphere as exists in those regions—great *intensity of sunlight.*

"Equability of temperature, of course, does not exist at considerable elevations in the temperate zone The great monthly and annual ranges of temperature at the various stations mentioned, together with the great and sudden daily fluctuations, show no approach to anything like reasonable equability of temperature. . . . .

"In lieu of any further general observations I quote from the publications prepared for the railroad companies:—'The statistics of the United States Army Reports demonstrate the important fact that New Mexico has the lowest ratio of respiratory diseases to be found in the country, the cases being 1·3 per thousand, while in various other localities the proportion ranges from 2·3 to 6·9. A very striking evidence of the curative character of this wonderful climate is found in the Army Records of the time of the Rebellion. Among the troops originally sent to New Mexico, in 1861, there were some 350 cases of catarrh: at the expiration of a year no cases were reported, and all who had the disease, and remained in the country, were cured.'" (p. 23.)

"Elevation above sea level may be spoken of as 'low,' 'medium,' and 'high altitude,'—ranging say from 1,500 to 6,000 feet. The latter may be considered as the 'line of immunity' in our latitudes.

"The proper altitude for any given patient should be chiefly determined by the condition of his heart's action. Feeble impulse and rapid action to begin with a low or moderate altitude (1,000 to 2,000); moderately weak impulse and rapidity of action somewhat above normal, to medium altitudes (2,500 to 4,000); no great variation from normal impulse and action, to high altitudes (4,500 feet and over). . . . ."

"The Spanish range of the Rocky Mountains enters the Territory from the north, and spreading out into spurs like the spread fingers of a hand, gives rise to numerous valleys between each spur. . . ." (pp. 3, 4.)

"Every degree of altitude is represented, from 3,000 feet to 8,000 feet and over.

"The Atchison, Topeka, and Santa Fé Railroad traverses the Territory from north to south. Along its line have grown up the principal towns and settlements representing all the above elevations. . . . .

"Coming from the east through Kansas, and passing through New Mexico from north to south, an invalid is enabled to make a slow journey, beginning at a comparatively low altitude in Kansas, and travelling westward, to gradually ascend until an elevation of from 6,000 to 7,000 feet is reached. This may be accomplished without deviating from a straight course westward, and yet to stop at towns of such size as to afford the necessary comforts of life, good food, society, medical attendance and other things pertaining to civilization. To illustrate this I will give the names of such places from east to west on the railroad, together with their elevations :—

		Feet.
In Kansas	Topeka	904
,,	Emporia	1,161
,,	Newton	1,433
,,	Larned	2,015
,,	Kinsley	2,207
,,	Dodge City	2,499
,,	Lakin	3,020
In Colorado	Las Animas	3,959
,,	La Junta	4,117
,,	Trinidad	6,034
In New Mexico	Las Vegas	6,452
,,	Santa Fé	7,012

" Beginning in the *south* at the junction of the Territory of New Mexico with old Mexico and the State of Texas, the figures run upwards toward the north to Raton, near the Colorado line, as follows :—

	Feet.	
El Paso	3,662	
La Mesilla	3,844	
Socorro	4,665	
Silver City	5,890	not reached by rail in 1883.
Albuquerque	5,006	
Las Vegas	6,452	
Raton	7,861	

"Our next question relates to the *aseptic qualities* of the atmosphere, and the elements which render it so at these several elevations. [See pp. 118 and 149.]

"The low relative humidity of the elevated regions of New Mexico is primarily due to their far inland position, a fact dwelt upon by Dr. Charles Denison in his work 'Health Resorts in the Rocky Mountains,' and previous papers. The great distance from the Atlantic and Pacific Oceans, as well as from the Gulf of Mexico, would preclude any great quantity of moisture from these great sources; and such as it might be, is still further diminished and diluted as it ascends and spreads into space. The other source of more or less constant humidity, *subsoil moisture,* is naturally absent at such elevation, where the soil is a porous one. . . . ." (pp. 5, 6.)

"In comparing the dryness of those several localities, it will be observed that the Mesilla valley carries off the palm, both as regards relative humidity and precipitation; none of the monthly averages of five years show more than a trifle above half saturation (50 per cent.) while so low an average as 29 per cent. is reached, and, in one month, 18 per cent., a degree of dryness rarely attained. [See p. 120.] As proof of this I reproduce the mean relative humidity of various sections of our country (America):—

New England States	73	per cent.
Middle Atlantic States...	74	„
South Atlantic States	79	„
Gulf States	82	„
Lower Lake Regions	79	„
Upper Lake Regions	70	„
Ohio Valley, Tennessee and the North West	73	„
Lower Mississippi Valley	58	„
Denver, Colorado [see p. 313]	42	„

"Closely allied to the subject of dryness is that of *sunshine.* Of this there is an abundance in New Mexico, the number of perfectly clear days far out-numbering the over-cast, cloudy, and rainy ones, taken together." (pp. 8-9.)

"Of the advisability of remaining in one locality the year round I would say that a change in summer and winter is desirable. The more elevated positions on the mountains afford a retreat from the summer heat of the southern latitudes (especially in July and August), while the numerous little sheltered valleys and cañons afford protection from the sudden storms of winter. All these changes may be found within comparatively short distances, and in this manner many consumptives may continue to 'live within the bounds of restricted vitality.' . . ." (p. 24.)

DRAWBACKS.

"Equability of temperature is, of course, not found with altitude and dryness in New Mexico, and this fact makes it an undesirable climate for those cases of consumption in which *general sensitiveness and irritability of the mucous membranes and the skin is a prominent symptom.* This state of hypersensitiveness is not affected by the ruling degree of temperature (the mean), but by sudden and ungraded fluctuations. Neither is the '*irritable heart*' of such persons suited to high altitude, as it cannot be readily disciplined into normal action. (See p. 316.)

"But for all cases of slowly progressive destruction and infiltration there can be no question that as *dryness and equability are not found together* in temperate zones, dryness is the absolute requirement, and equability of temperature a secondary consideration.

"A perhaps still worse element of temperature, which is an invariable accompaniment of dryness, is the *diurnal range*—the fluctuation of the thermometer within twenty-four hours, as we find it in the Rocky Mountain region, or anywhere where the radiation of heat from the earth after sundown is not intercepted by the *moisture* blanket." [" Tyndall's Vapour Screen." See p. 33.]

"The diurnal ranges are all the way from 15° to 50° Fahr. In the Signal Service the daily readings are taken at 7 a.m., 2 p.m., and 9 p.m. There are two reasons why this great daily fluctuation should not be considered quite so much of an evil factor. One reason is that this variation is largely due to the sudden evaporation at nightfall, and is increased at night time—a time when patients should be *indoors,* after spending the day in the open air. Another reason is that changes at dry, elevated stations may be thermometrically great, but still convey only the sensation of comfort." (pp. 15, 16.)

"*Great velocity and persistency of wind* may, and do, prove harmful by the increased rapidity with which the warmth of the body is being continually carried off; an infliction under which the average consumptive gets chilled and fails to react, giving rise to internal congestions.

"At high altitudes, and in the absence of high shelter, winds of great frequency and long duration are plentiful. Most towns in New Mexico are built along the line of railroads, and as these roads mostly run parallel with mountain ranges, the majority are visited by frequent and *persistent winds, which are a source of great discomfort and irritation to the consumptives, more especially so when accompanied by dust.* The only remedy for this nuisance lies in selecting such spots as are located in a nook or corner of the mountains, protected on several sides by high hills. In other words, protection against winds is to *be found in local shelter* only.

In the matter of local shelter, Santa Fé, Socorro, Silver City, Las Vegas Hot Springs* (not the town) and Raton are favoured spots." (p. 17.)

In New Mexico we do not find that variety and grandeur of scenery which distinguishes Colorado. It is of a more subdued order, yet there are many quaint and charming spots." (p. 19.)

A writer in the *Times* says (August 18, 1884):—" Las Vegas the capital of San Miguel county, and one of the most important towns in New Mexico, has a population of 7,000, and stands on a plateau 6,000 feet above sea-level on a small stream with the high-sounding name of the Gallinas. Portions of the Mexican town with the brown adobe-built, flat-roofed, one-roomed houses, are 200 years old, but since the Atchison, Topeka, and Santa Fé brought in their road seven years ago, a modern American town has been built, some of it on the other side of the Gallinas. . . .

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* These hot springs are of the alkaline muriate class.

"The old freight road through the mountains from Las Vegas west to Santa Fé is thirty-six miles, but the railroad makes it eighty-three miles, a great deal of the route being among striking scenery, through great ravines of sandstone, among picturesque gorges, round a double sweep. with more of the letter S curves than the famous horse-shoe bend among the Alleghanies, above Altonna, following for miles the course of the Pecos river, catching occasional glimpses of a Mexican village, its gray-brown adobe houses not easily discernible at a distance.

"Up the mountain ridges our train, dragged by two engines, runs along rocky ledges commanding broad expanses of rolling country studded with pines, cedar, and juniper, which, although not of large growth, make an effective woodland panorama, and shelter abundance of deer, bear, and wild turkey. The plain occasionally terraced with benches, in one place indented with what might be an immense amphitheatre, is broken with *mesas* and conical shaped hills dotted with oases of grass parks of several hundred acres, while the Santa Fé mountains, snow-capped, forty miles distant but appearing close at hand, form a bold background. . . .

"Santa Fé—City of the Holy Faith—the capital of New Mexico, on the spur of the Rockies, 7,000 feet above sea-level, is built on both sides of a creek. Two of the churches and the governor's palace date back for three hundred years, and attest the durability of the *adobe*, or sun-dried bricks, of which they and many more modern houses are built. Around most houses of any pretensions, whether of one or two stories, project usually from nine feet to ten feet of portrell or verandah, extending along the whole street, or entirely around detached buildings, and affording admirable shade. The better class of houses are often constructed with their rooms entering from an open quadrangle, the portrell extending all round, and reproduced for the benefit of the second story, where there is one. In the centre of the town is a *plaza*, or square, of two and a-half acres, with trees, a well, and a sandstone obelisk, erected to the memory of the men who fell in the civil war. Constructed of the admirable ubiquitous sandstone, with iron front and plate-glass window, a few two-storied imposing American stores are being built, in somewhat ridiculous contrast to the adjacent, one-storied adobes."

After the foregoing pages had gone to press the following letter, confirmatory of my remarks at p. 313, appeared in the "British Medical Journal," Feb. 21, 1885 :—

"THE CLIMATE OF COLORADO.

"SIR,—In answer to Dr. Hudson's query, in your issue of January 31st, as to the suitability of the climate of Colorado in phthisis, I have much pleasure in giving my observations, gained during a short stay there a few years ago. Colorado Springs or Maniton may be taken as the central or typical resorts of this district. The former is situated on an open plain, at a height of 6,000 feet above the sea, and directly faces the immense and grand range of the Rocky Mountains, the base of which is only about six miles distant. The air is exceedingly dry and invigorating, with a mean annual temperature of 9·44° C. (49° F.). Thus, though this place is at a greater altitude than Davos, it has a more temperate climate. The population is growing rapidly, as the medical practitioners of the eastern States are sending large numbers of their phthisical patients to this elevated tableland with the very best results. The accommodation is now very good, both here and at Maniton.

"Dr. Denison has proved a great amelioration to take place in consumptives who have stayed in these places sufficiently long to give them a fair trial. He attributes this to the diathermancy of the air, that is, the difference between sun and shade temperatures, which is one degree greater for every rise of 235 feet. This is due to (1) the rarefaction of the air, and (2) the diminution of moisture held in suspense.

"Maniton is situated at the very base of Pike's Peak, one of the highest points of the range (14,336 feet); it is about six miles from Colorado Springs, and is a more interesting place in itself. The mineral springs here, which are very highly charged with carbonic acid, are said to resemble those of Ems: and there is no doubt, with their aid, that this place will become a national watering-place and health-resort, so good and healthy is its position, so beautiful are its surroundings, and so many are the natural attractions of the place, and the excursions that may be taken therefrom. Unlike the mountains in Switzerland, these are quite accessible, little snow remaining, even on the highest peaks, during the summer. Indeed, this chain of mountains forms such a natural barrier to storms, etc., that but little rain or snow falls in the plain to the east of them, on which Colorado Springs, Denver, etc., are situated.

"Denver, the capital of the State, is scarcely as healthy, I should say, nor as interesting, as the places I have already mentioned. It is situated at a considerably greater distance from the base of the mountains, on an open bare plain, and is, therefore, very hot and dusty in summer, and not so protected in winter.

"The following are some statistics Dr. Denison gathered as to the results he has obtained in his practice:—

Stage of Disease.	Number of Cases.	Improved.	Per-centage.	Stationary.	Worse.
First stage......	75	74	99	0	1
Second stage...	42	28	67	6	8
Third stage ...	85	37	44	17	36

" Before closing this imperfect account of this beautiful and health-giving State of Colorado, I cannot omit a saying among the Americans which demonstrates their conviction of the healthiness of the climate ; for they say that, in one sense, those who go there dying of consumption are nearly always disappointed, for they go expecting to die, and they 'can't do it.'

" Yours truly,

" H. COUPLAND TAYLOR, M.D."

CHAPTER X.

CONCLUDING REMARKS.

Drawbacks at Bournemouth : Children's Services on the Sands; Paddling; Habits of the Boys who drive Pony and Donkey Chairs.—Note on Bournemouth in Summer : Excellence of its Sands for Bathing—Directions for Sea Bathing and Sea-water Baths — Sea Temperatures.

It may fairly be remarked that as there are so many drawbacks at all other places there must be some at Bournemouth.

Well! I will mention a few which so seriously concern the welfare of the "rising generation," that they cannot fail to interest their elders of this.

1st. Children's services on the sands. 2nd. Paddling. And as these proceedings are carried on during the same season, and frequently alternate with each other on the same days—the children running from one to the other—they are intimately related in their evil results. With regard to paddling I will quote some excellent words of warning and advice contained in the "Holiday number of The London Medical Record," with which I warmly agree, and the truth and importance of which are amply confirmed by the records in my case-books, of catarrhs, inflamed glands, ulcerated throats, and acute congestions and rheumatic attacks, clearly traceable to paddling; and with regard to children's services on the sands, my case-books painfully remind me of serious chills of excited and inflamed brains in delicate children, and of contagious and infectious diseases originating and propagated by these unwise congregations of children, hastily called together from their play, without classification or selection, seated on damp sands, often with damp clothes and damp feet, with a hot sun upon their heads and surrounded by a hot crowd of miscellaneous loiterers, while their little brains are inflamed by stirring discourses, the subjects of which have not been chosen by their parents or guardians to suit the respective ages, states of health, or temperaments of the children.

In addition to all other considerations, let it be remembered that in these days of educational pressure—in which the only debateable question is whether the pressure on the children is *more* than they can bear, or *just as much* as they can bear—children are sent to the seaside not only to invigorate their bodies, but also to relax this pressure and rest their brains; and, therefore, they ought not to be allured *into defeating these important objects*, prescribed for them after careful consideration by those who best understand their needs.

I speak with the greatest respect for the intentions of those good people, whoever they may be, who devote their time and energies to organising and conducting these sand-services for what they, of course, consider to be the *good of the children.* And I am sure they will desist from the work when they are convinced that it *does harm instead of good.* As a physician, seeing this harm, I am bound to advise parents to insist that their governesses and nurses shall not take their children to these dangerous assemblies, and also that they should put a stop to the injurious practice of paddling.

More than half the good, and, in some cases, more than all the good, that can possibly be got out of children's holidays by the sea is lost by the unwisdom of the way in which they are spent.

In London practice, during and after the sea-side bathing season, we used always to have a torrent of consultations on persons of all ages suffering from the effects of injudicious bathing. And as the temptations and opportunities for sea-bathing at Bournemouth are very great; "the strand is magnificent, extending for miles in either direction, formed of clean hard sand, constituting unquestionably the finest and safest bathing ground in the kingdom ;"* I feel that I ought not to conclude my book without giving the following directions on the subject.

First, however, let me mention one other drawback at Bournemouth, viz., the pony and donkey chairs in which invalids go up and down the hills or along the sands. These would be an excellent, cheap and most useful institution if properly guarded; but they are spoilt and rendered offensive and dangerous by two circumstances:—1. As they are open, and usually driven by boys who do not take sufficient care to keep them dry, they are almost always damp, and no invalid should venture into an open chair or carriage without laying a large thick rug or shawl in the seat, and seeing that it keeps the shoulders, back, hips, thighs and legs from the possibility of contact with the damp seats of the conveyance. 2. The boys who drive these donkey and pony chairs have a most objectionable and offensive habit of sitting in them when they are not occupied by a "fare." I advise patients, for obvious reasons, not to get into a public conveyance if they see the driver occupying it himself first.

PADDLING.

(Extracted from "Reports on some Home and Foreign Health Resorts, &c., being the Holiday Number of the *London Medical Record*," 1884.)

"The practice of 'paddling,' or moving about in water barely up to the knees, needs only to be mentioned to be condemned. It has none of the elements of intelligent bathing, and generally ends in congestive headache and bilious vomiting, sometimes both. Children appear to suffer more than adults from this practice, probably because they are not so well qualified to withstand the depressing effects of prolonged immersion, and also because of their greater susceptibility to external impressions. The number of children who come under treatment from these causes during the bathing season is very great, and not a few are seriously ill. Moreover, paddling generally takes place during the hottest part of the day, when the sun beats fiercely on the head, whilst the feet are chilled by the cold immersion, so that the disastrous results are but the natural outcome of a most pernicious and foolish practice." (p. 13.)

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* The *Warrington Guardian*, Jan. 10, 1880.

I may note that, while I write, August 1884, I have four cases under treatment for the results of paddling. One a little girl of four years, who in addition to great general derangement, has a mass of enlarged glands in the neck concomitant upon sore throat, that are yielding without suppuration but have narrowly escaped it. Another little girl of seven, with a mass of glands in the neck which have suppurated and are obstinately discharging. One very tall girl of twelve, who had menstruated once without derangement of health, but who paddled a week before the next period was due, and this has been followed by arrest and much consequent illness at an important epoch. One a lady of twenty-one, who was foolish enough to paddle with some school-girls at a gipsy party, and has suffered arrest of menstruation and congestion of the ovaries, liver and lungs.

SEA BATHING.

(Extracted from "*Medical Climatology, etc.*, by R. E. Scoresby Jackson, M.D., F.R.S.E., etc.")

"Sea-bathing is employed both in preventive and curative medicine. In the former it cleanses the skin and renews its elasticity and contractility, thereby imparting additional vigour and activity to the frame, and lessening the tendency to take cold during exposure to vicissitudes of temperature. In the latter it operates much in the same way, adding firmness and tone to the textures, and so increasing the functional activity of the vascular, nervous, and secretory systems.

In all cases which show impaired functional powers without any manifestation of inflammatory symptoms; in short, in those cases in which the exhibition of alteratives and tonics is indicated, sea-bathing may, with proper precautions, be resorted to. It is contra-indicated in persons of plethoric habit of body; in cerebral congestion; in organic diseases of the heart; in aneurism, and, indeed, in such cases as have not the ability to *encounter the severe shock;* and, moreover, at certain periods in which the female constitution is not prepared for the application of powerful remedies.

"Sea-bathing occasions great exposure of the body, and therefore it is proper to employ as much caution as possible during the process, as well as subsequently. Invalids ought not to bathe in the sea before breakfast nor soon after a meal. About ten o'clock in the forenoon is a convenient time, especially if the tide be nearly at its height. *A hard, sandy, sloping beach, with the tide at two-thirds of flood,* is the best place for bathing. It is not good to enter the water when the body is cold. This chilly feeling should first be dissipated by a short walk, which, however, should not be permitted to induce either fatigue or perspiration. The entire body should be immersed in the water as quickly as possible, and the bather ought to move about briskly, either by swimming or otherwise, until he leaves it. Three, four, or at most five minutes, is quite long enough for the beneficial effects of the bath, and any delay beyond that time will be injurious. Brisk rubbing with rough towels is the next process, and subsequently reaction should be brought about and maintained by quickly covering the body with clothing of suitable texture, and by gentle exercise. The best season of the year for sea-bathing is that extending from June to October. It should not be practised more than twice or three times a week at first, and never more frequently than *once* a day. The same precautions should be pursued after the intermission of the baths, and at the end of the course it is better to decrease their frequency gradually than to put a stop to them suddenly.

"Warm baths of sea water are used with advantage in certain cases where from feebleness or other causes, the sea itself cannot be employed with safety." (pp. 43-4.)

"There is nothing so catching—if one may so speak—as sea-bathing: to watch others bathe is almost certain to end in bathing oneself. ("*London Medical Record*," Op. cit.)* Be the result what it may, the temptation is too strong to be resisted. It seems such a very innocent amusement that there surely cannot be any harm in it. It is in reality, however a very powerful agent, capable of both good and harm, and when judiciously employed one of the most valuable and trustworthy aids in the renovation of health. But indiscriminate bathing cannot be productive of benefit, but rather of harm to many individuals. Bathing, to be beneficial, must be practised with intelligence, and, above all, with common-sense; otherwise risks are incurred which sometimes are dangerous to health, and occasionally to life itself. . . .

"It will be found in practice that a satisfactory answer to these two questions—'*When* ought one to bathe?' and '*How* ought one to bathe?'—will embrace nearly all that need be said on the subject to a patient going to the seaside in pursuit of health. . . .

"There are various methods of entering the sea, but the general opinion of those who are practically acquainted with the subject appears to be that to plunge in headforemost is the best mode—in other words, 'to take a header' as soon as one is divested of clothing.

"And here, it may be remarked, that no time should be lost in undressing; for dawdling in a semi-nude condition means a serious loss of animal heat, which detracts largely from the enjoyment of the bath, and lessens the reactive glow.

"It should be remembered that the suddenness of the shock of the plunge intensifies the impression on the cutaneous nerves, and through them upon the nervous centres, calling forth in response a reaction of corresponding vigour. It is not everybody, however, who has the courage necessary for a 'header,' nor is every beach adapted for its practice. . . . Persons who are too timid to plunge should lose no time in 'ducking' the head beneath the waves as soon as the feet touch the water, otherwise the suddenness of the shock, which is so material to energetic reaction, is altogether lost, and the benefit derived from bathing is much lessened. . . .

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* See also "Sea Air and Sea Bathing, by Charles Parsons, M.D., Churchill's Popular Medical Series."

"Those who have been accustomed to bathe in the sea are aware that, after the lapse of a certain number of minutes, the bath ceases to be enjoyable, the glow of reaction is no longer felt, and a sensation of chilliness, with chattering of the teeth supervenes. In this case it is manifest that the bath has been too prolonged, and no benefit will be experienced.

"It is confessedly difficult, indeed impossible, to lay down a rule of universal application for the guidance of patients in this matter; but it may be safely said that *it is better to err in remaining in the water for too short a time than for too long.* Most of the injurious consequences of sea bathing arise from the latter cause, and no harm at all results from the former. . . .

"Some interesting researches upon this subject have been recently made by M. P. Aubert ('Lyon Medical'), with a view to ascertain the actual physiological action of sea bathing, both brief and prolonged, upon the human body; and the conclusions which he draws from his investigations are in entire agreement with the observations obtained by experience. It appears from his experiments, which were conducted with great accuracy, that very brief immersions of thirty or forty-five *seconds* have but little effect upon the temperature beyond lowering it for a few minutes after the bath; *but in baths lasting for five minutes* he found that, during immersion, the *central temperature* rose nine-tenths of a degree (0·9°); on coming out it fell rapidly, 0·6° or 0·7,° and then slowly regained the original temperature, and sometimes sank 0·2° below it. As regards the *cutaneous temperature* it fell five degrees and four-tenths (5·4°) during immersion, 0·5° more in the course of five minutes after leaving the water (total, 5·9°) and an hour after the bath the temperature was still one degree (1·0°) lower than on entering the water.

"It is clear, therefore, that in baths of this character, we have all the benefits we desire to obtain from sea-bathing; there is no dangerous reduction of central temperature; reaction is promoted and maintained; no chilling sensation remains after the bath, but a pleasant glow pervades the body and imparts a buoyancy of spirit and elasticity of frame which are very enjoyable.

"In baths lasting fifteen minutes, M. Aubert found that the highest central temperature was attained five minutes after immersion, and that it remained above the initial temperature till exit, when it rapidly fell, and only slowly, after a lapse of two hours recovered the point of departure. The temperature of the skin was found to correspond with the sensations which were experienced at the time, viz., a rapid loss of cutaneous heat during the bath, and a very slow recovery of it after exit from the sea.

"These experiments of M. Aubert, however, were made upon himself, at a time when he was in perfect health, and no harm followed; *but invalids and delicate persons who are tempted to follow his example must not count upon similar immunity.*

"As regards baths of longer duration, say from twenty to thirty-five minutes, it appears that a marked sensation of chill was experienced at between twenty and twenty-five minutes, which was persistent for some hours after the termination of the bath; and in one instance the temperature, four hours after entering the sea, was found to be still 0·7° lower than at the time of immersion.

"Hence the wisdom of the precept that we should not remain in the water till this sensation of chill supervenes, but should leave it whilst reaction continues.

"It only remains to speak of exercise *after* bathing. As has been said before, this *should be moderate* rather than violent, sufficient to restore the cutaneous circulation without inducing perspiration." (pp. 11-14.)

SEA TEMPERATURE ROUND OUR COASTS.*

"In *February* the (sea-surface) temperature never reaches 50°. It closely approaches that degree at the entrance of the Channel, ranges about 45° round the coast of Ireland, and falls nearly to 40° along the *East* coast of Great Britain from the Thames to Shetland.

"In August the change from the conditions just described is considerable. The sea round the Irish coast is about 10° warmer than in February (55°), while along the English Channel and as far up as the Wash a uniform temperature of nearly 60° exists. In the last-named district the annual variation is nearly 20°. Passing farther north we find stations giving a mean reading of nearly 55° on the North Sea coasts, and of fully that temperature on those exposed to the Atlantic. Here, then, the annual range is about 15°.

"Of course these figures do not make any claim to precise accuracy, but they are sufficient to show that the mean temperature of the sea surface *is most constant at the entrance of the Channel* and least so off the mouth of the Thames. These are also the districts which are marked by great contrasts between the range of *air* temperature, which is small in Cornwall, but comparatively large in the *south-east* of England, *where the conditions most nearly approach those of the Continent of Europe*." (pp. 319-320.)

AN AMERICAN VISITOR'S NOTES ON BOURNEMOUTH.
(July 16, 1884.)

"From being a Winter place it became a Summer resort, so that it now has a double season. It is a common fallacy—

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* Scott, Op. cit.

which in the case of Bournemouth has been repeatedly refuted —that a place which is warm in winter must of necessity be warm in summer. Meteorological observations over a number of years have clearly indicated, however, that Bournemouth is a singularly cool place in summer, while there is an utter absence of that glare which is so painfully apparent in many other watering places. A more charming place in the summer and autumn it is difficult to imagine. The multitude of excursions, both by sea and land; the trips into the New Forest on the one side, or to Corfe Castle and many other places of interest on the other; the grand bay [see Plate I.], which stretches away as far as the eye can see, with a *beach that is unequalled for bathing;* the Promenade; the Pier; the bands; the romantic walks along the two cliffs or among the golden gorse and purple heather and pine woods inland; affording boundless opportunities for recreation and enjoyment.

"Steamboats make trips 'round the island.' Cowes, Ryde, Portsmouth, and Weymouth are within the limits of an excursion. The coast of France, Torquay, and Dartmouth are not too far for the more adventurous explorers. Geologists will find plenty of special attractions in Swanage. And from Peveril Ledge to Lulworth the ground is full of specimens ready for the botanist and entomologist."

APPENDIX.

Dr. T. A. Compton, M.D., B.A., Fellow of the Royal Meteorological Society, has kindly submitted to me his accurate and elaborate records, taken in the Bournemouth district during the eighteen years, 1867 to 1884 inclusive. The results of these observations have never before been published, and notwithstanding my desire (stated in Chapter I.) to avoid figures as far as possible, I feel it would be wanting in respect for Dr. Compton's courtesy in placing his records before me, and for the great labour which he bestowed in reducing them to a concise and presentable form, if I did not, at least, publish the following summary of some of the chief points contained in his reports, which more especially relate to the general statements contained in this work regarding the climate of Bournemouth and its surroundings.

1. MEAN DAILY MAXIMUM OF EACH MONTH FOR EIGHTEEN YEARS.

Jan.	Feb.	Mar	Apr.	May	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
44·5	46·7	49·0	54·6	59·6	65·1	68·8	68·8	64·3	56·6	49·5	45·0

2. MEAN DAILY MINIMUM OF EACH MONTH.

Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
35·8	38·0	37·1	40·9	44·4	50·4	54·2	54·3	50·8	45·0	39.0	36·1

3. MEAN DAILY RANGE OF EACH MONTH.*

Jan	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
8·7	8·7	11·9	13·7	15·2	14·7	14·6	14·5	13·6	11·6	10·5	8·9

* "That the diurnal range of temperature is directly connected with the sun's rays appears from the fact that it is obliterated by cloudy weather or by fog, and is also entirely absent through the long and dreary winter of the Polar regions. . . . That the range is almost

4. THE ADOPTED MEAN TEMPERATURE.

(Glaisher's method.)

Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
40·2	42 2	42·5	46·8	51·1	56·7	60·3	60·7	57·0	50·4	44·1	40·8

5. ADOPTED MEAN TEMPERATURE OF THE YEAR

(By Glaisher's method) 49·4.

6. The maximum temperature of the year was above 80° in eight years, and below 80° in ten years ; and in eighteen years 82° was only twice exceeded, viz., in 1868 and 1876.

7. THE MEAN AMOUNT OF CLOUD FOR EACH MONTH (0 to 10).

Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept	Oct.	Nov.	Dec.
6·1	6·1	4·6	4·4	3·9	4·2	4·2	4·1	4·1	4·1	4·9	5·8

8. THE MEAN AMOUNT OF HUMIDITY (RELATIVE HUMIDITY) FOR EACH MONTH—(Saturation, 100).[*]

Jan.	Feb.	Mar.	Apr.	May.	June.	July	Aug.	Sept.	Oct.	Nov.	Dec.
86	88	81	78	76	76	77	77	79	83	85	86

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entirely due to the action of the heat of the sun's rays falling on the dry land, is shown by the fact that at sea, close to the Equator, it is hardly perceptible, while on a small island, like Ascension, it is well marked. In both cases, however, the state of equilibrium between loss and gain is reached earlier than at a comparatively inland station, such as Greenwich for example, and the apex of the curve *approximates to noon*. . . . The amount of this diurnal range, therefore, depends in some measure on the distance of the station from the sea coast." (Scott, Op. cit., p. 215.)

[*] "The results of hygrometrical observations may be calculated in various ways :—

"1. We can determine the dew point. . . . 2. We can determine the actual pressure corresponding to the amount of vapour present in the air at the time. This is called the Vapour Tension (or some times, but *incorrectly*, the Absolute Humidity). This result may, by

9. THE MEAN AMOUNT OF RAINFALL FOR EACH MONTH.

Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
3·20	2·50	1·80	1·96	1·66	1·85	2·30	2·34	2·94	3·23	3·09	3·01

Average annual rainfall, 29·88 inches.*

10. AVERAGE NUMBER OF DAYS ON WHICH ANY (·005 INCHES) RAIN FELL.†

Jan.	Feb.	Mar.	Apr.	May	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
17	16	12	12	12	11	13	12	14	16	14	16

11. AVERAGE NUMBER OF DAYS ON WHICH THE WIND BLEW FROM EACH QUARTER DURING THE YEAR.

N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.
39	50	26	28	26	70	68	49	9

During the winter six months (October to March inclusive) the average of S.W. and W. winds is 64, against 40 for N.E. and E.

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an easy calculation, be expressed in terms of the weight of water contained in a given volume of air—*e.g.*, in a cubic foot. 3. We can ascertain from tables the greatest amount of vapour which the air could possibly contain, at its temperature at the time of observation. This is given by the vapour tension corresponding to the temperature of the air. If the vapour tension given by direct observation corresponds with this amount, the air is said to be saturated; but if not, the proportion which the actual vapour tension bears to this maximum amount is called the Fraction of Saturation, or more commonly, the Relative Humidity." (Scott, Op. cit., p. 110.)

* "In these islands the annual rainfall 'at sea-level' ranges from sixty to eighty inches on the west coast of Ireland and Scotland, to about twenty inches on the east coast of England. In some localities the fall is much greater, amounting to 154 inches, on the average of six years at Seathwaite, in Borrowdale." (Scott, Op. cit., p. 137.)

† 0·01 of an inch is an amount practically insignificant. A fall of 0·10 of an inch of rain might ordinarily be called a wet day. (Scott, Op. cit., p. 335.)

BRIGHT SUNSHINE.[*]

As Campbell's Sunshine Recorder has only been at work for six years, the period is too short for the monthly or yearly averages to be of much value ; but the following are the actual numbers of hours registered since 1879 at the only English stations which began its use as early as 1879 :—

	1879.	1880.	1881.	1882.	1883.	1884.
Greenwich	983	1,214	1,301	1,245	1,241	1,115
Kew	976	1,368	1,467	1,448	1,483	1,312
Glynde...	1,038	1,323	1,445	1,562	1,502	1,296
Southbourne	1,224	1,515	1,701	1,738	1,647	1,424

[*] "A measurement of the duration of sunshine is very desirable, and a very simple method of effecting this was devised by Mr. J. F. Campbell, F.G.S., and is now (1883) in use at about thirty stations in the British Isles. It consists in the exposure to the sun's rays of a sphere of glass, which acts as a lens. The image of the sun formed by this sphere is received upon a strip of millboard, stretched on a frame at the proper focal distance. When the sun shines a hole is burnt in the millboard, and as soon as the sun sets, or is hidden by a cloud, the record ceases. It is obvious that such a method gives *no measure of the intensity of solar radiation*, but merely records the length of time for which the *sun shone with sufficient intensity* to burn a sheet of mill board." (Scott, Op. cit., p. 58.)

Wertheimer, Lea and Co., Printers, Circus Place, London Wall.

DESCRIPTIVE CATALOGUE OF OTHER WORKS BY DR. DOBELL.

◆

"We should be at a loss to name any one in Great Britain whose writings . . . . . repay earnest study more richly than those of Dr. Dobell. Whatever comes from his pen has that happy combination of personal clinical observation with the 'traditions of learning,' which Lord Verulam laid down as the highest quality of medical teaching."—*Medical and Surgical Reporter, Philadelphia.*

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